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SATURN SA-8/PEGASUS B POSTFLIGHT TRAJECTORY

by JONATHAN B. HAUSSLER AND ROBERT H. BENSON
Aero-Astroynamics Laboratory

NASA

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*George C. Marshall
Space Flight Center,
Huntsville, Alabama*

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ABSTRACT

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This report presents the postflight trajectory for the Saturn SA-8/PEGASUS B test flight. Fifth of the Block II series, SA-8 was the second vehicle to carry a Pegasus payload. Trajectory-dependent parameters are given in earth-fixed, space-fixed ephemeris, and geographic coordinate systems. A complete time history of the powered flight trajectory is presented at 1.0 sec intervals from first motion to S-I/S-IV separation and at 5.0 sec intervals from S-I/S-IV separation to insertion. Tables of insertion conditions and various orbital parameters are included in a discussion of the orbital portion of flight.

Haussler



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AERO-ASTRODYNAMICS LABORATORY
RESEARCH AND DEVELOPMENT OPERATIONS



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SUMMARY

The powered flight trajectory presented here was established from the information provided by external electrical and optical tracking systems and the onboard telemetry system. External tracking data were available from fixed cameras, C-band radar, ODOP, Azusa/GLOTRAC and MISTRAM. Onboard data were obtained from the radar altimeter and the guidance system. The final powered flight trajectory was determined from fixed camera, ODOP, MISTRAM, Azusa/GLOTRAC and C-band radar. GLOTRAC and MISTRAM provided very reliable data for nearly the entire powered flight. Both systems were used extensively in the final trajectory. All of the radars furnished reliable range data; however, some of the angle measurements contained relatively large biases.

SA-8/PEGASUS B was the sixth engineering test of the radar altimeter. The altimeter acquired reliable data from 160 to 215 sec and 418 to 522 sec. This was considerably less data than was available on SA-9.

The S-IV payload at insertion (634.151 sec) had a space-fixed velocity 0.7 m/s (2.3 ft/s) less than nominal, a perigee altitude of 506.5 km (273.5 nm) and an apogee altitude of 748.5 km (404.2 nm). The estimated lifetime of the S-IV/PEGASUS B orbiting vehicle is approximately 1220 days, which is 10 days less than the nominal lifetime.

1.0 INTRODUCTION

The SA-8 Saturn vehicle was launched from Cape Kennedy on May 25, 1965, at 2:35:01 Eastern Standard Time. Approximately 10 min and 34 sec after launch, the S-IV stage, instrument unit, boilerplate Apollo, and the Pegasus B Meteoroid Technology Satellite were inserted into orbit. The Apollo and shroud were first separated from the S-IV/IU and Pegasus combination, and wing deployment on the Pegasus was completed 4.5 min after insertion.

SA-8 was the fifth flight test of the Saturn I, Block II vehicle, which includes an active S-IV stage. This was the second flight test with a micrometeoroid experiment, Pegasus B. In addition, this was the fourth flight test with the adaptive guidance in closed loop during the S-IV powered phase.

This report presents the postflight mass point trajectory in tabular form from first motion to insertion in Tables IX through XIII and XV through XIX. Also presented are detailed discussions of data sources and their utilization, estimated accuracies of the trajectory, and the booster free flight trajectory. A table of orbital data available on the first five revolutions is included in the discussion of the orbital portion of flight. An analysis of the various orbital tracking networks is also presented.

All times listed in this report are referenced to Range Zero (2:35:01 EST) unless otherwise noted. The time of first motion was defined, from stub fin displacement measurements, as occurring 0.18 sec before Range Zero.

Acknowledgement is given to the Data Reduction Branch of the Computation Laboratory for their efforts in the preparation of the tabulated trajectory data and to the General Electric Trajectories Programming Unit for programmer support in orbit determination.

2.0 COORDINATE SYSTEMS AND TRAJECTORY PARAMETERS

The translational motion of the vehicle's center of gravity is described in several coordinate systems. An initial displacement of 32.0 m (105.0 ft) locates the center of gravity in the coordinate system whose origin lies on the reference ellipsoid. Definitions of the coordinate systems are found in the Appendix.

The Fischer Ellipsoid was used to represent the earth and its gravitational field. Launch pad coordinates are defined with respect to this ellipsoid.

The geographic coordinates and gravity data for Launch Pad 37B at Cape Kennedy are

Geodetic Latitude:	28.531854 deg N
Longitude:	80.564953 deg W
Gravity:	9.818 m/s ² (32.21 ft/s ²)

Elevations above the reference ellipsoid are

Base of launch pedestal:	4.9 m (16.1 ft)
C. G. at First Motion:	32.0 m (105.0 ft)
Launch Azimuth:	90 deg E of N
Flight Azimuth:	105 deg E of N
ST-124 Platform Azimuth	104.999 deg E of N

3.0 POWERED FLIGHT TRAJECTORY ANALYSIS

3.1 Data Sources

Tracking data were available from first motion through insertion. The tracking coverage is illustrated in Figure 1 and itemized in Table I. The relation between the SA-8 flight path and the various tracking sites is shown in Figure 2.

All tracking systems experienced difficulty in maintaining track during S-I cutoff and separation.

3.1.1 Antenna Locations

Figure 3 shows the location of the antennas for the various tracking systems and the vehicle's center of gravity versus time. The tracking data used in establishing the trajectory were transferred to the vehicle's center of gravity to provide a common reference point for all of the tracking systems.

3.1.2 MISTRAM

Missile Trajectory Measurement (MISTRAM) System tracking data from the Valkaria station were used in the construction of the final trajectory. The final MISTRAM using the active and passive data from both stations were used for comparison only. The following data were used in the MISTRAM reduction:

<u>Range Time (sec)</u>	<u>Source</u>
50.0 - 148.4	Valkaria (active)
154.7 - 337.5	
340.0 - 357.8	
424.1 - 630.7	Valkaria (passive)
212.5 - 357.8	Eleuthera (passive)
360.0 - 366.8	
368.1 - 749.2	Eleuthera (active)

The data were reliable for the periods of powered flight for which they were available. Random error was estimated to be less than 7 m (23 ft). Comparisons between the MISTRAM data and the reference trajectory are shown in Figures 7 through 9.

3.1.3 GLOTRAC

SA-8 was the fourth engineering test of the GLOTRAC system on a Saturn vehicle. The data received were continuous from 25 sec throughout powered flight, making GLOTRAC the only high precision system that provided continuous data during the S-IV powered flight. Comparisons between GLOTRAC and the reference trajectory are shown in Figures 7 through 9.

3.1.4 Radar Altimeter

An engineering test of the radar altimeter was performed on SA-8. Valid data were obtained between 160 and 215 sec and between 418 and 522 sec. An antenna null caused the dropout between 215 and 418 sec. After 522 sec the altitude of the vehicle exceeded the capability of the altimeter. Changes have been made on the SA-10 altimeter to increase its range. The 100 m bias observed on previous flights did not occur on SA-8. A hardware modification was made after the SA-9 flight to eliminate this bias.

3.1.5 GLOTRAC Station I (MARK II AZUSA)

GLOTRAC Station I, which on previous flights has been referred to as the Azusa tracking system, furnished an independent set of tracking data. Comparisons between GLOTRAC Station I and the reference trajectory (Figures 7 through 9) show deviations of less than 75 m (246 ft) in the X and Z components. The vertical component (Y) which is normally the most difficult to determine reaches a maximum deviation of 320 m (1050 ft) at insertion.

3.1.6 ODOP

The ODOP tracking data were used in establishing the SA-8 trajectory from 20 to 100 sec. During this time interval, the ODOP data are far superior to the data from any other system. Comparisons between ODOP and the reference trajectory are shown in Figures 7 through 9. After S-I/S-IV separation, ODOP deviates from the reference trajectory attaining maximum differences at 600 sec of 75 m (246 ft) in X, 320 m (1050 ft) in Y, and 125 m (410 ft) in Z.

3.1.7 Radar

The Grand Bahama (3.16) radar was the only FPS-16 radar that furnished powered flight tracking data on SA-8. A comparison of the measured parameters with the reference trajectory is shown in Figures 4 through 6. There appears to be a bias of 0.015 deg in the elevation angle.

The Grand Bahama (3.18) radar provided data for the first time on SA-8. The data were of good quality with a small bias in the azimuth angle measurement. Comparisons with the reference trajectory are presented in Figures 4 through 6.

The Grand Turk (7.18) radar was considerably better than on SA-9. Comparisons with the reference trajectory are shown in Figures 4 through 6. The maximum angular deviations are 0.03 deg which is less than half of the maximum deviation on SA-9.

Merritt Island (19.18) radar provided good data for the second time on SA-8. The elevation angle deviated about 0.02 deg from the reference trajectory.

Antigua (91.18) radar provided good range and azimuth data for the interval it tracked. The elevation angle measurement contained a small bias of about 0.017 deg.

The range measurement on all of the radars shows larger deviations than on previous vehicles. This is caused by an inconsistency between the radar tracking systems and the high precision systems (GLOTRAC, MISTRAM, and ODOP). The high precision tracking data were used to establish the reference trajectory (see Section 3.2).

3.2 Trajectory Composition

External tracking data, telemetered guidance data and the insertion point from orbital tracking were used to establish the postflight trajectory. This trajectory was constructed in the following manner:

<u>Interval (sec)</u>	<u>Description</u>
0.0 - 20.0	Fixed Camera and ODOP data were used in a least squares curve fit. The differences between the resulting curve fit and the actual data were negligible. (Reference 1 discusses in detail the method used to establish this portion of the trajectory.)
20.0 - 100.0	ODOP data processed by the smoothing and differentiation program (see the following paragraphs for more discussion on the smoothing and differentiation program).
100.0 - 164.5	MISTRAM data processed by the smoothing and differentiation program. Telemetered guidance data were used to determine the velocity and acceleration component profile through the cutoff area.

164.5 - 634.151

A least squares adjustment of the telemetered guidance velocities to the GLOTRAC data and the insertion point obtained from orbital tracking.

Since the trajectory was constructed from several different sources, it was necessary to provide for a merging or blending process to compensate for small biases that existed between data from the various sources. A merging program (a least square technique) was used to connect the data from the different sources without creating sharp transients.

The least squares adjustment of the telemetered guidance velocities to the GLOTRAC data and the insertion point was necessary because of the inconsistencies between the high precision powered flight tracking systems and the orbital tracking. These inconsistencies among data are considerably larger, up to 100 m (328 ft) in Z, than on previous vehicles. However, these inconsistencies are within the estimated uncertainty of the trajectory.

The ODOP, MISTRAM and computed trajectory earth-fixed Cartesian position data were smoothed over a 10 sec interval using coefficients which are the average of fourth and second degree smoothing coefficients. These coefficients have a frequency response curve which makes them very desirable for tracking data filtering. The velocity and acceleration data were obtained using fourth degree coefficients because significant bias would be induced if the average derivative coefficients were used. A more detailed discussion of the smoothing and differentiation technique can be found in Reference 2.

3.2.1 First Motion Time

Pad measurements 32-B01 and 32-B02 (Displacement at Stub Fins I and III) and vehicle displacement obtained from camera data were available for the determination of first motion time. The first motion times, indicated by these sources, are given below.

<u>Measurement</u>	<u>Range Time (sec)</u>
32-B01 and 32-B02	-0.18
Camera Data	-0.16

The decision was made by the Flight Evaluation Working Group to use the pad measurements for the determination of the first motion time.

3.2.2 Powered Flight Trajectory

Table II presents a comparison of actual and nominal times of some of the vehicle events in sequential order. The actual altitude and surface range are shown in Figures 10 and 11, respectively, for the entire powered flight. The actual total inertial acceleration profiles for the S-I stage and the S-IV stage are shown in Figure 12. The actual earth-fixed velocity vector and the angle between the earth-fixed velocity vector and the local horizontal plane, are shown in Figure 13. The actual space-fixed velocity and the angle between the space-fixed velocity vector and the local horizontal plane are shown in Figure 14. Mach number and dynamic pressure are shown for the S-I stage powered flight in Figure 15. These parameters were calculated using measured meteorological data to an altitude of 41 km (134000 ft). Above this altitude the U. S. Standard Reference Atmosphere was used.

Various trajectory parameters are given at significant event times in Table III. It should be noted that apex, loss of telemetry signal and impact apply only to the discarded S-I stage. Several trajectory parameters are given for S-I stage inboard engine cutoff (IECO), S-I stage outboard engine cutoff (OECO) and S-IV stage guidance cutoff (S-IV CO) in Table IV. The velocity gain between OECO and separation due to thrust decay was 2.0 m/s (6.6 ft/s). The velocity gain from S-IV CO to the end of thrust decay was 2.9 m/s (9.5 ft/s).

A comparison of the actual and nominal trajectory can be found in Reference 3. The nominal SA-8 trajectory can be found in Reference 4.

The actual trajectory is presented in the metric system of units in Tables IX through XIII and in the English system of units in Tables XV through XIX.

3.3 Error Analysis of Reference Trajectory

During the S-I powered portion of flight, good coverage was provided by ODOP, GLOTRAC Station I (MARK II AZUSA), GLOTRAC and MISTRAM. ODOP and MISTRAM were used to establish the majority of the reference trajectory during this period.

Data from the various high precision tracking systems are compared in the earth-fixed plumbline coordinate system with the reference trajectory in Figures 7 through 9. All data were smoothed and transferred from the point of track (antenna locations) to a common point, the vehicle's center of gravity. These curves show only the trend of the data relative to the reference trajectory. The dispersion of the various data gives an indication of the validity of the reference trajectory. All of the parameters agree within 150 m (492 ft) except the Y component of ODOP and GLOTRAC Station I. Past vehicles have shown that ODOP and GLOTRAC Station I deviated from the reference trajectory rather drastically in the Y component.

Comparisons of the radar measured parameters and the GLOTRAC Station I (Mark II Azusa) range measurement with the reference trajectory are shown in Figures 4 through 6. The range measurements deviate a maximum of 48 m (157 ft) from the reference trajectory. All of the range measurement deviations show the same systematic trend from the reference trajectory. As the reference trajectory deviates from GLOTRAC, it agrees better with the radar ranges and the insertion parameters. These trends indicate possible errors in the GLOTRAC data, but since its quoted accuracies are better than radar, the GLOTRAC was selected for the initial portion of the S-IV stage reference trajectory. The tracking data discrepancies existing on SA-8 lower the confidence level of the reference trajectory. The azimuth and elevation angle comparisons show biases in some of the systems.

An estimate of the probable total uncertainty in the powered flight reference trajectory is presented in Figure 16. At OEEO, the position components are probably accurate to 20 m (66 ft) and the velocity components to 0.2 m/s (0.7 ft/s). By S-IV CO, the maximum uncertainties have increased to about 0.5 m/s (1.6 ft/s) in velocity components and 250 m (820 ft) in position components.

4.0 S-I STAGE FREE FLIGHT TRAJECTORY

A theoretical free flight trajectory was computed for the discarded S-I stage using initial conditions at separation from the reference trajectory. Nominal retro-rocket performance and outboard engine decay were assumed. On previous flights there was a radar tracking the discarded S-I stage that was used to determine the initial conditions for the free flight trajectory. On SA-8 there was no radar scheduled to track the booster.

Since the attitude of the booster during re-entry is unknown, a nominal tumbling drag coefficient was assumed. In addition, nominal coefficients of drag were used assuming the booster (1) stabilized at an angle of attack of 90 deg and (2) stabilized at an angle of attack of 0 deg. These provide the following dispersions:

<u>Drag Conditions</u>	<u>Impace Range</u>	<u>Impact Time</u>
0 deg Angle of Attack	988.02 km (533.49 nm)	656.6 sec
Tumbling	980.86 km (529.62 nm)	720.9 sec
90 deg Angle of Attack	976.87 km (527.47 nm)	773.2 sec

The theoretical free flight trajectory utilizing the tumbling drag coefficient data will be considered as the actual trajectory of the S-I booster stage. The impact location relative to the launch site is shown in Figure 17. The trajectory is presented in tabular form in Tables VIII (metric units) and XIV (English units).

5.0 ORBITAL FLIGHT

5.1 Orbital Trajectory

The S-IV-8 stage with Pegasus B Instrument Unit and an Apollo boilerplate payload was inserted into orbit on May 25, 1965, at 07:45:35.151 U. T. (634.151 sec range time). The orbital insertion parameters for SA-8 were determined by a least squares differential correction procedure using C-band radar beacon and skin track data over approximately the first earth revolution.

The classical osculating two-body elements and the corresponding position and space-fixed velocity vectors at orbital insertion are shown in Table V. The orbital elements are referenced to the mean equinox and equator at 0 hr U. T. the day of launch.

A comparison between some of the actual and nominal (preflight trajectory) orbital insertion parameters is shown in Table VI.

The RMS error of the data residuals and the number of data observations utilized are listed in the following table.

INSERTION SOLUTION TRACKING

<u>Station</u>	<u>Time of Track (Universal Time)</u>	<u>Data Types</u>	<u>No. of Valid Observations</u>	<u>RMS Error of Residuals</u>
Antigua Island (FPQ-6)	07:45:37- 07:52:01	AZ EL	52 54	0.003 deg 0.005 deg
BEACON TRACK	(636-1020 sec R. T.)	RA	55	7 m (23 ft)
Grand Turk Island (TPQ-18)	07:45:38- 07:49:21	AZ EL	31 34	0.005 deg 0.014 deg
BEACON TRACK	(637-860 sec R. T.)	RA	37	7 m (23 ft)
Merritt Island, Fla. (TPQ-18)	07:45:37- 07:46:13	AZ EL	7 7	0.011 deg 0.059 deg
BEACON TRACK	(636-672 sec R. T.)	RA	7	5 m (16 ft)
Grand Bahama Island (TPQ-18)	07:45:37- 07:47:17	AZ EL	100 86	0.012 deg 0.015 deg
BEACON TRACK	(636-736 sec R. T.)	RA	86	2 m (7 ft)
Merritt Island, Fla. SKIN TRACK	09:23:33- 09:26:51	AZ EL RA	32 32 31	0.019 deg 0.052 deg 13 m (43 ft)
Grand Turk Island SKIN TRACK	09:25:14- 09:28:36	AZ EL RA	25 27 27	0.026 deg 0.033 deg 12 m (39 ft)
Antigua Island SKIN TRACK	09:27:30- 09:31:48	AZ EL RA	43 43 40	0.019 deg 0.045 deg 8 m (26 ft)

The RMS residual errors quoted represent the difference between actual radar observations and the predicted observations based on the orbital ephemeris defined by the orbital insertion parameters. In addition, the orbital ephemeris, which was used to generate the predicted tracking, had a velocity impulse of approximately -0.22 m/s applied at the separation time of the Apollo and shroud from the S-IV/Pegasus B (806 sec R. T.). The magnitude and direction of this impulse were determined from the telemetered output of the guidance system.

The RMS residual errors were from 1 to 4 times higher than the expected high frequency errors of the measuring systems employed for range measurements and from 1 to 20 times higher for the angle measurements. Included in the RMS residual errors are high frequency errors (assumed gaussian) and systematic errors due to possible instrumentation bias, mathematical model errors and atmospheric refraction errors. The maximum RMS error of the radar residuals was 13 m (43 ft) in range, 0.06 deg in elevation and 0.03 deg in azimuth. Expected high frequency errors of the measuring systems are 3 m (10 ft) in range and 0.003 deg in angles for the FPQ-6 and TPQ-18 radars (design specifications).

Obvious systematic bias errors are present in the Merritt Island elevation residuals of approximately 0.05 deg. These errors were somewhat expected as comments received from the RCA Data Reduction group at the Kennedy Space Center indicate a bias developed in the Y parameter after 555 sec R. T. Since the Y parameter is the altitude parameter, this error would be reflected in the elevation angle data. Other biases are experienced in the skin track angle data from Antigua and Grand Turk on the second pass over those stations. When these biases are removed, the maximum RMS residual errors for the angle measurements were reduced to 0.02 deg in azimuth and 0.03 deg in elevation, approximately 1 to 10 times the expected high frequency errors. The relative weighting of the observations used in the insertion solutions, according to the expected high frequency errors, requires that the solutions be primarily determined by the range observations. Therefore, when removed, biases of the magnitudes and types quoted do not affect the solution parameters shown by any appreciable amount (less than 5 m (16 ft) in any position component and 0.03 m/s (0.10 ft/s) in any velocity component).

5.2 Orbital Insertion Analysis

Insertion condition solutions were made using the Antigua, Merritt Island, Grand Turk, and Grand Bahama data at insertion and the Antigua, Merritt Island and Grand Turk data at the end of the first earth revolution in various combinations. Solutions were obtained for all data sources with and without solving for effective drag. These solutions indicate a maximum deviation from the insertion elements quoted of 0.5 m/s (1.6 ft/s) and 250 m (820 ft) in any velocity or position component, respectively.

An independent solution of the orbital insertion parameters using powered flight tracking and guidance data shows a maximum deviation of 100 m (330 ft) and 0.5 m/s (1.6 ft/s) in any position or velocity component compared to the orbital tracking insertion solution quoted. The powered flight tracking and guidance data trajectory quoted was constrained to the orbital tracking insertion elements shown in Table V.

The relative agreements between the independent orbital and power flight solutions indicate a maximum error in the quoted insertion position and velocity components of 250 m (820 ft) and 0.5 m/s (1.6 ft/s), respectively.

5.3 Orbital Tracking Summary

Due to the long lifetime of the SA-8 orbiting vehicle, radar tracking coverage was requested only for the first five revolutions. This tracking summary covers all tracking over these five revolutions beginning at insertion (07:45:35.151 U. T.).

Orbital tracking of the SA-8 vehicle was conducted by the NASA Space Tracking and Data Acquisition Network (STADAN), which is composed of the global network of Minitrack stations and Minitrack Optical Tracking Stations (MOTS), and the Manned Space Flight Network (MSFN), a global network of radar tracking stations which also utilizes available DOD elements.

Table VII summarizes the radar and Minitrack tracking during the first five revolutions. The last radar C-Band beacon track of the orbiting vehicle was reported by Pretoria, South Africa at approximately 08:20 U. T. (45 min after liftoff). All subsequent radar tracking was skin track.

No optical sightings over the first five revolutions have been received by MSFC.

Minitrack observations will continue to be made on the orbiting vehicle during the vehicle's lifetime or until termination of the Pegasus B experiment.

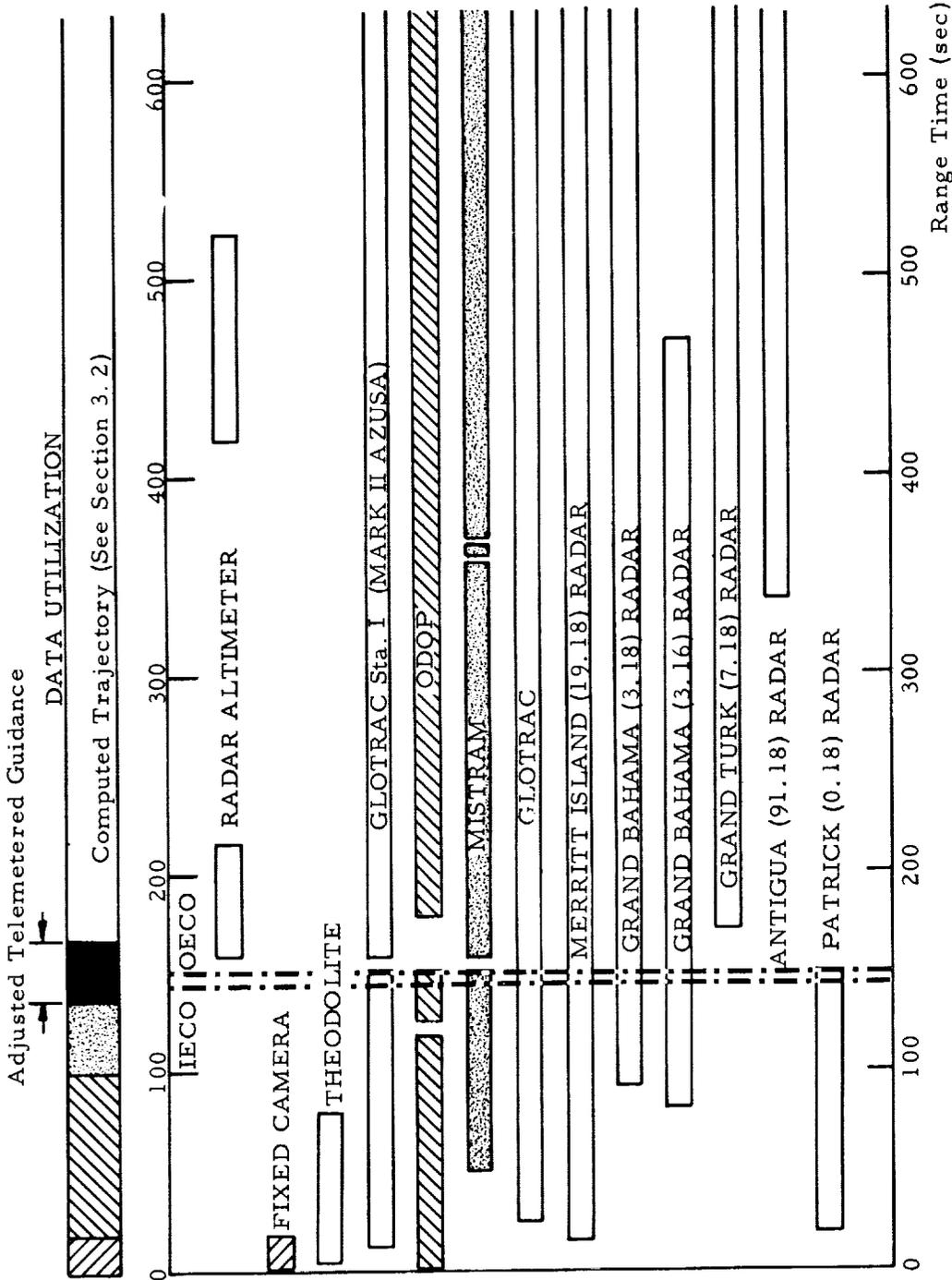


FIGURE 1. AVAILABLE FINAL TRACKING DATA (POWERED FLIGHT)

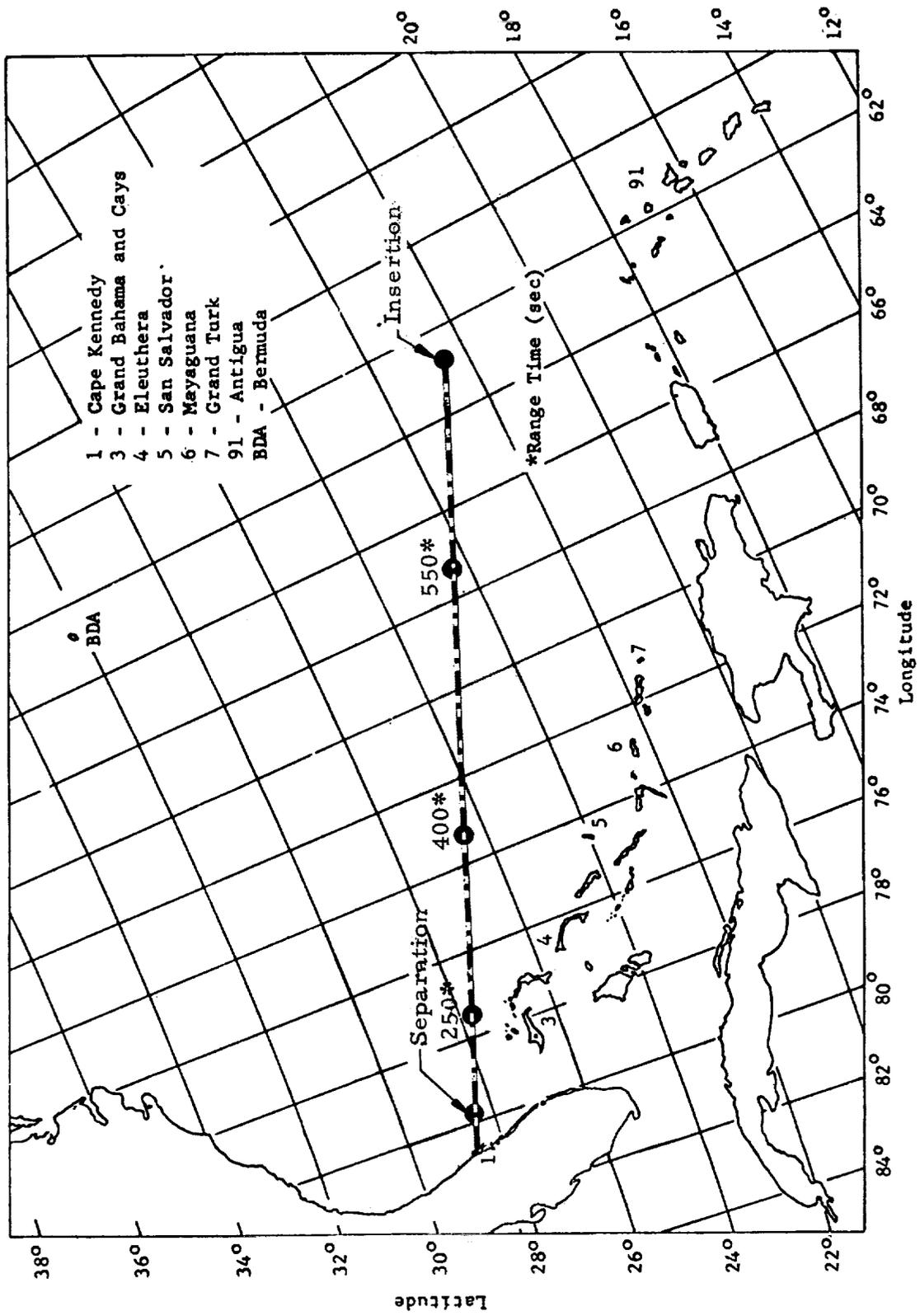


FIGURE 2. TRACKING STATIONS

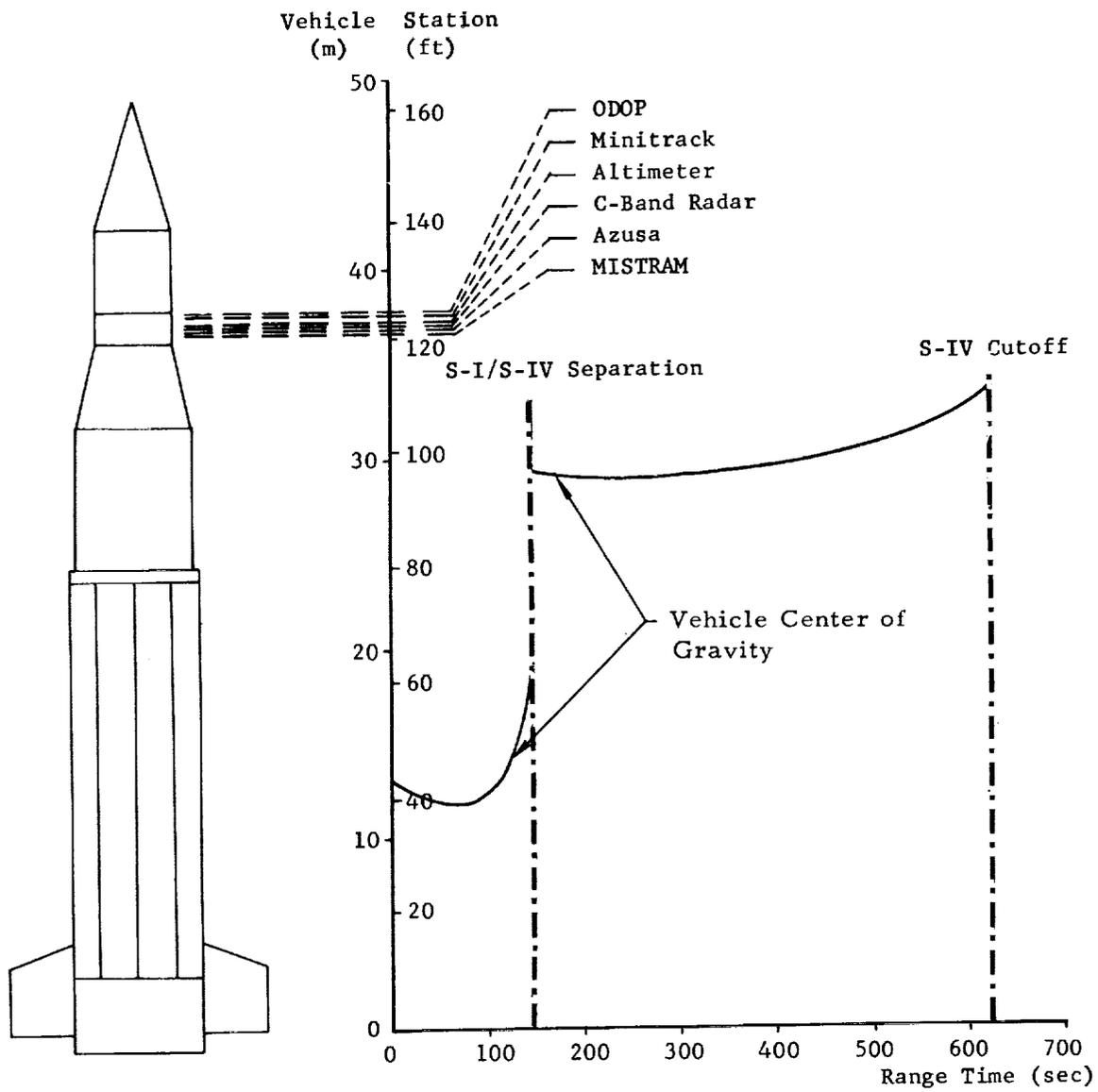


FIGURE 3. ANTENNA LOCATIONS AND VEHICLE CENTER OF GRAVITY VERSUS RANGE TIME

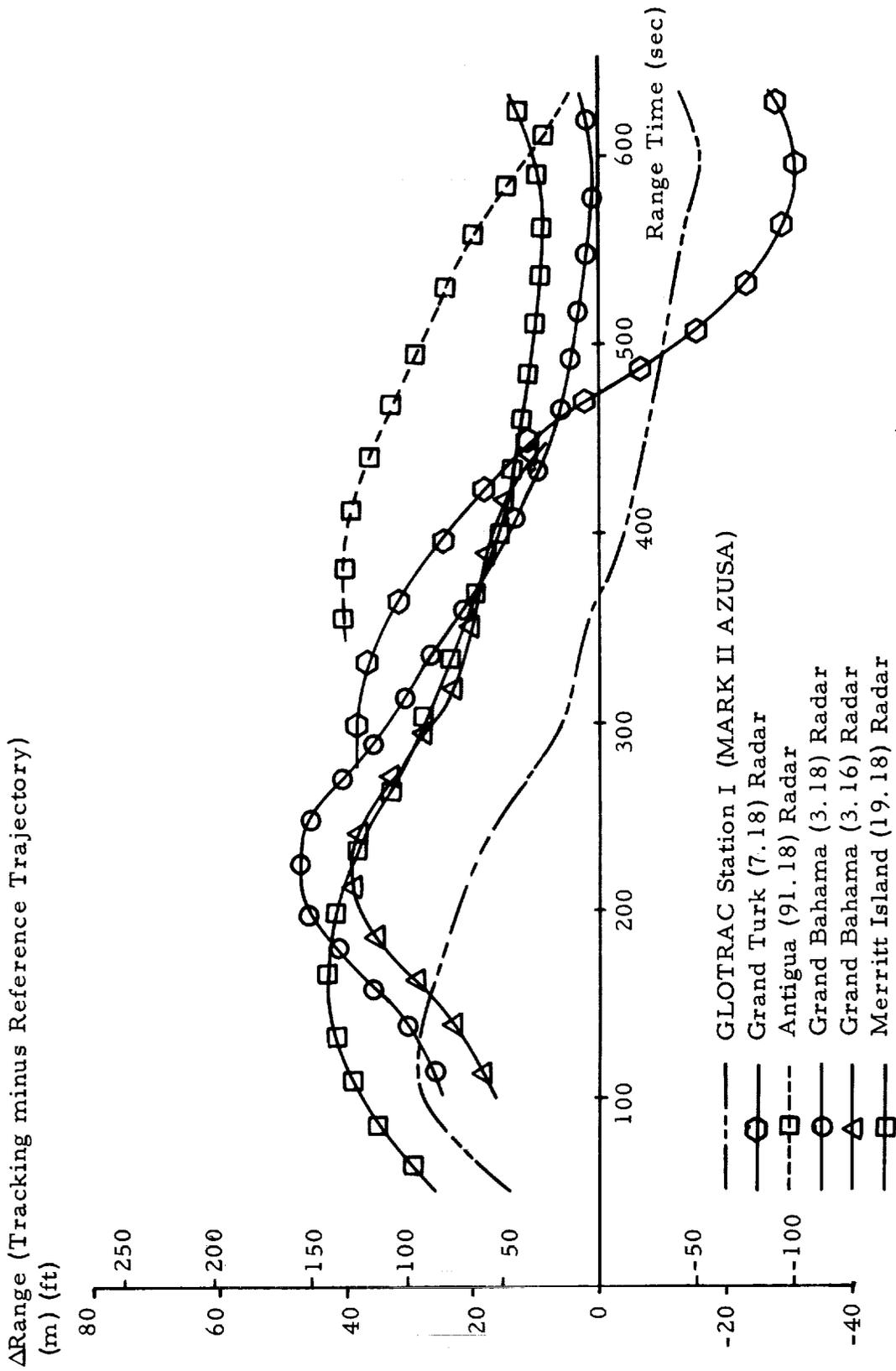


FIGURE 4. MEASURED PARAMETER TRACKING COMPARISONS (RANGE)

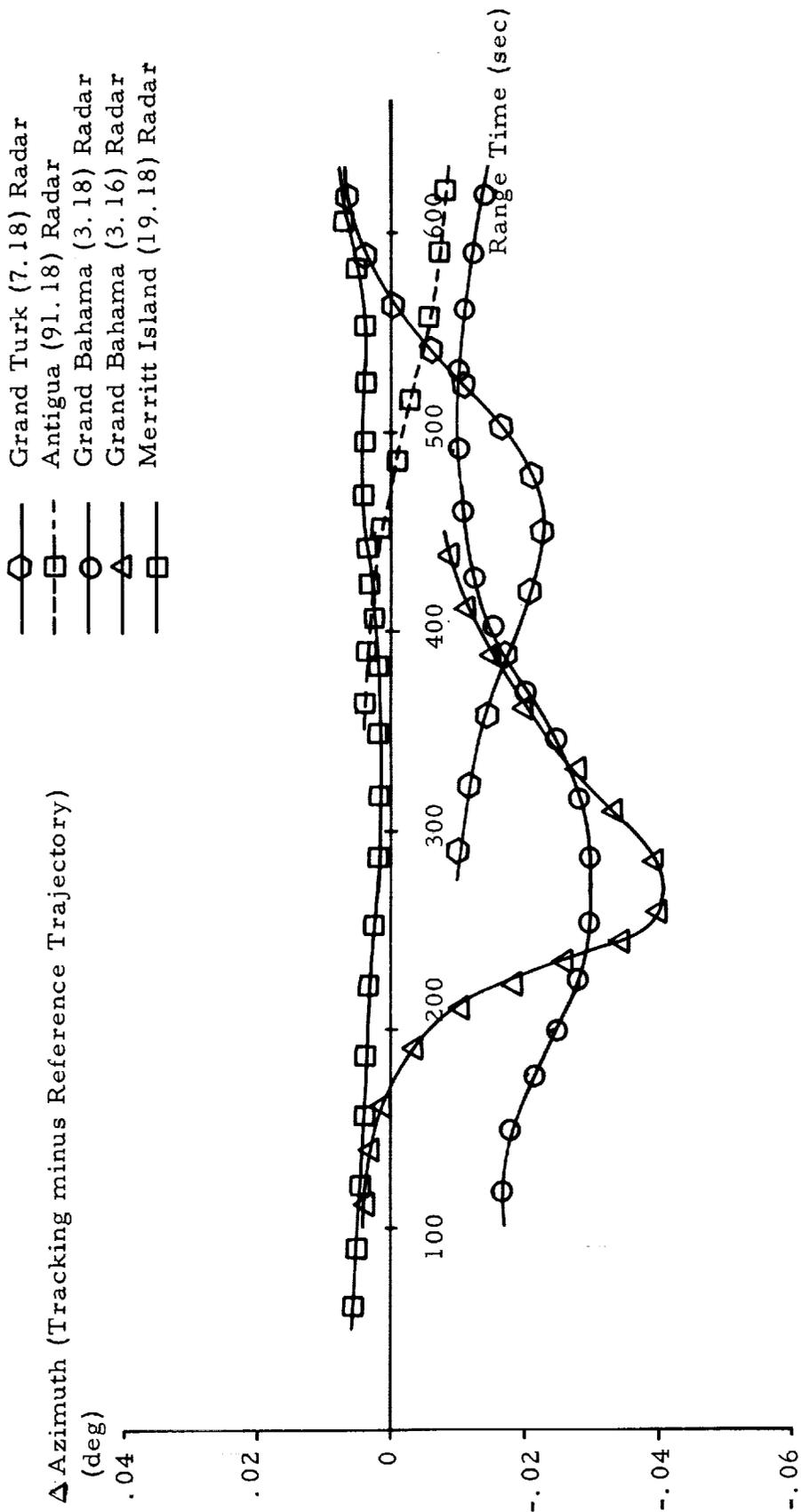


FIGURE 5. MEASURED PARAMETER TRACKING COMPARISONS (AZIMUTH)

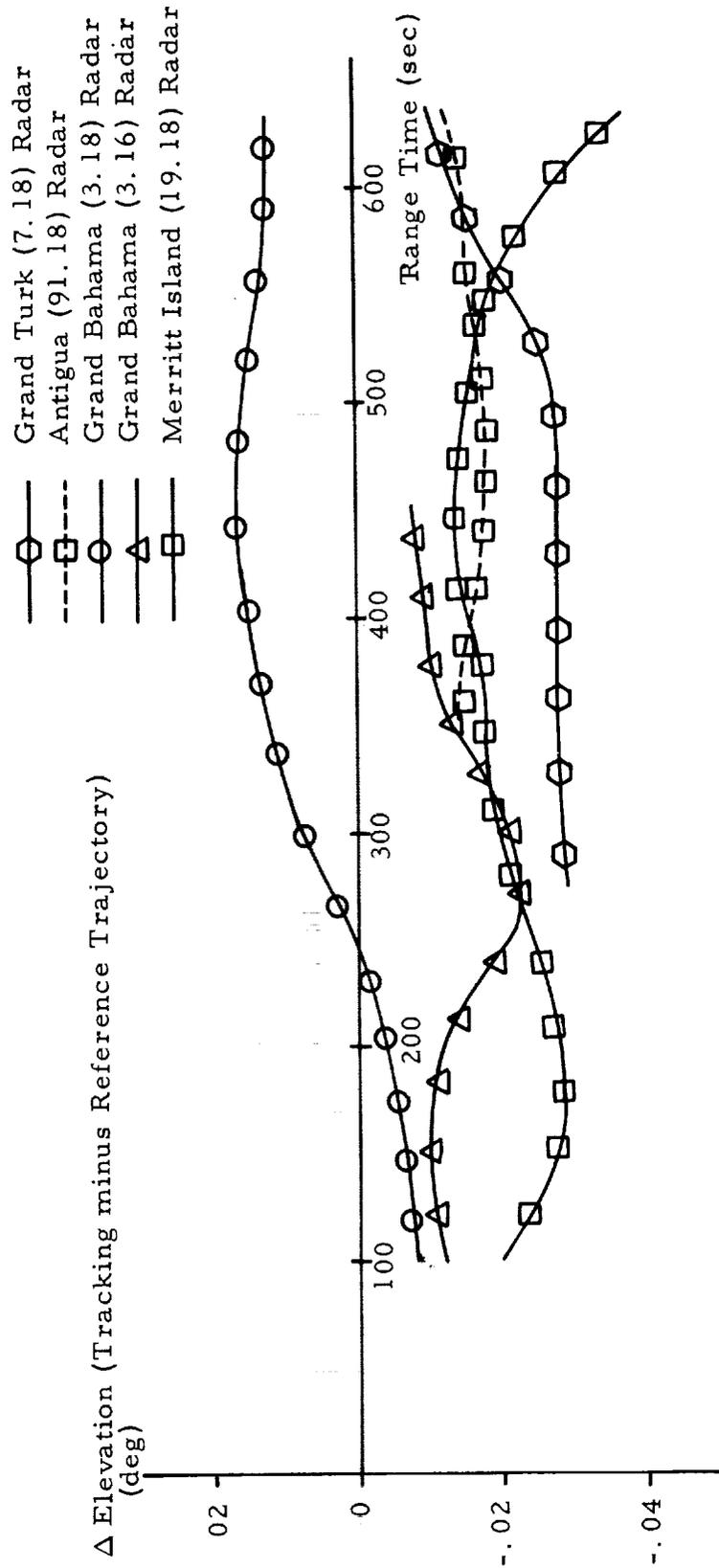


FIGURE 6. MEASURED PARAMETER TRACKING COMPARISONS (ELEVATION)

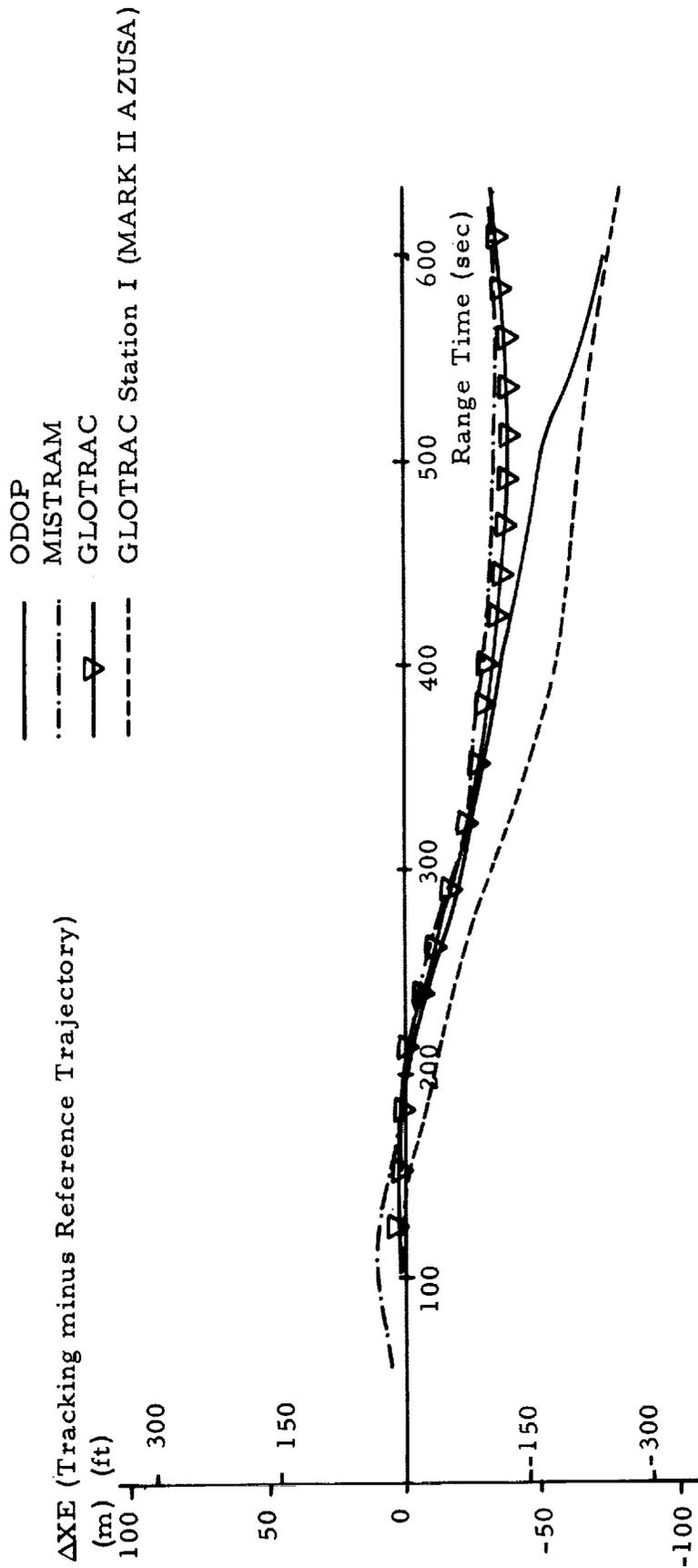


FIGURE 7. METRIC TRACKING COMPARISONS

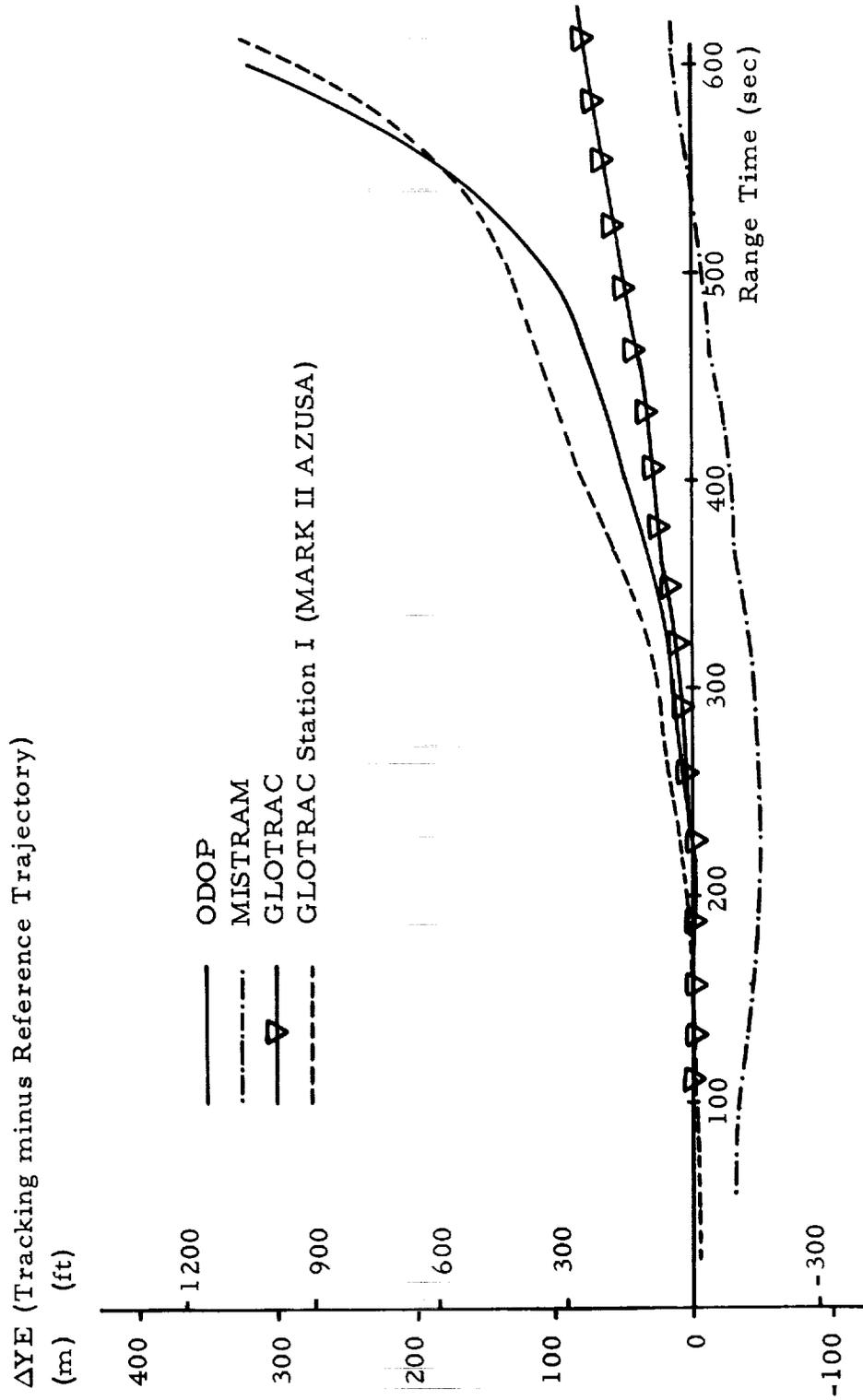


FIGURE 8. METRIC TRACKING COMPARISONS

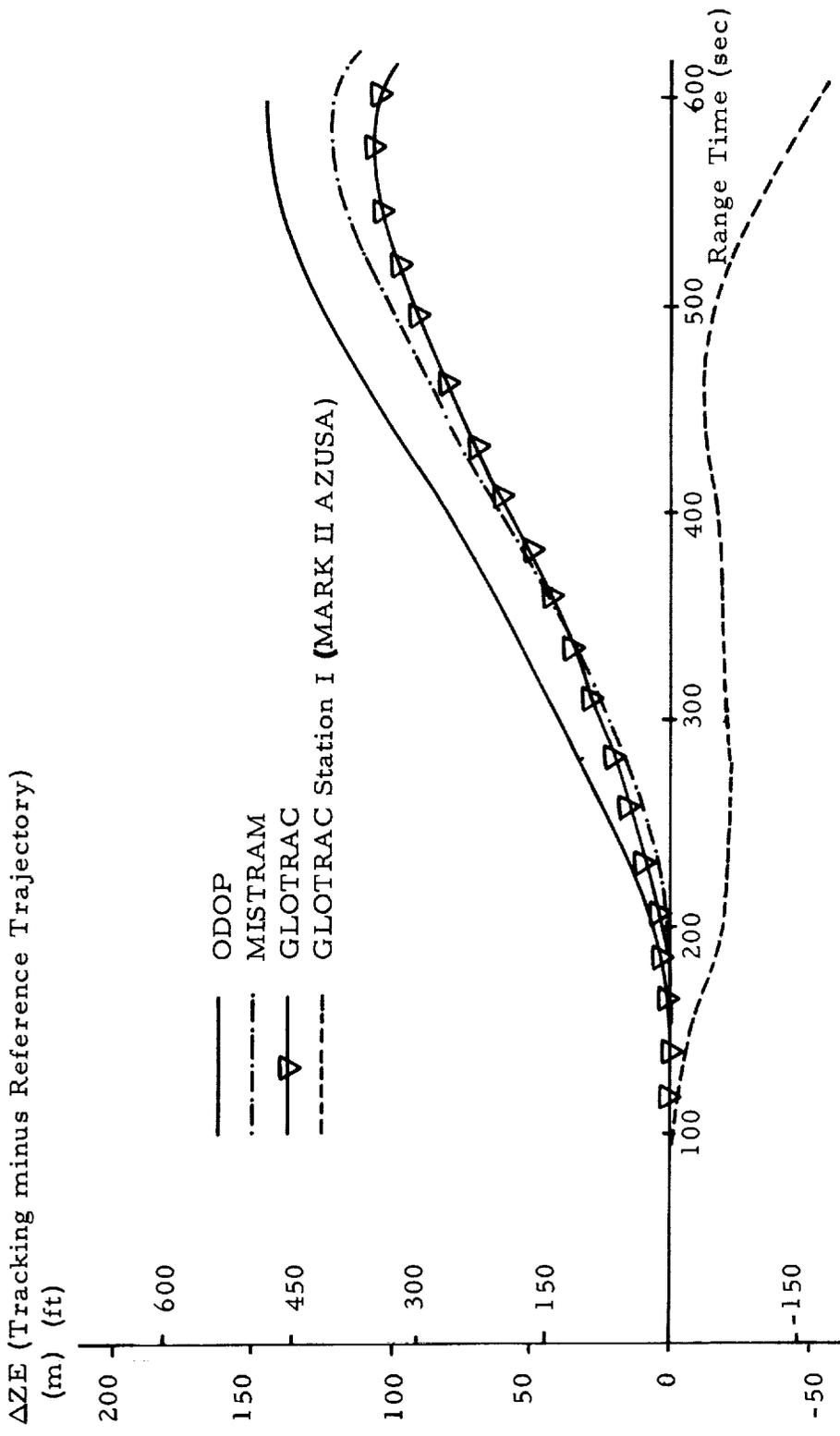


FIGURE 9, METRIC TRACKING COMPARISONS

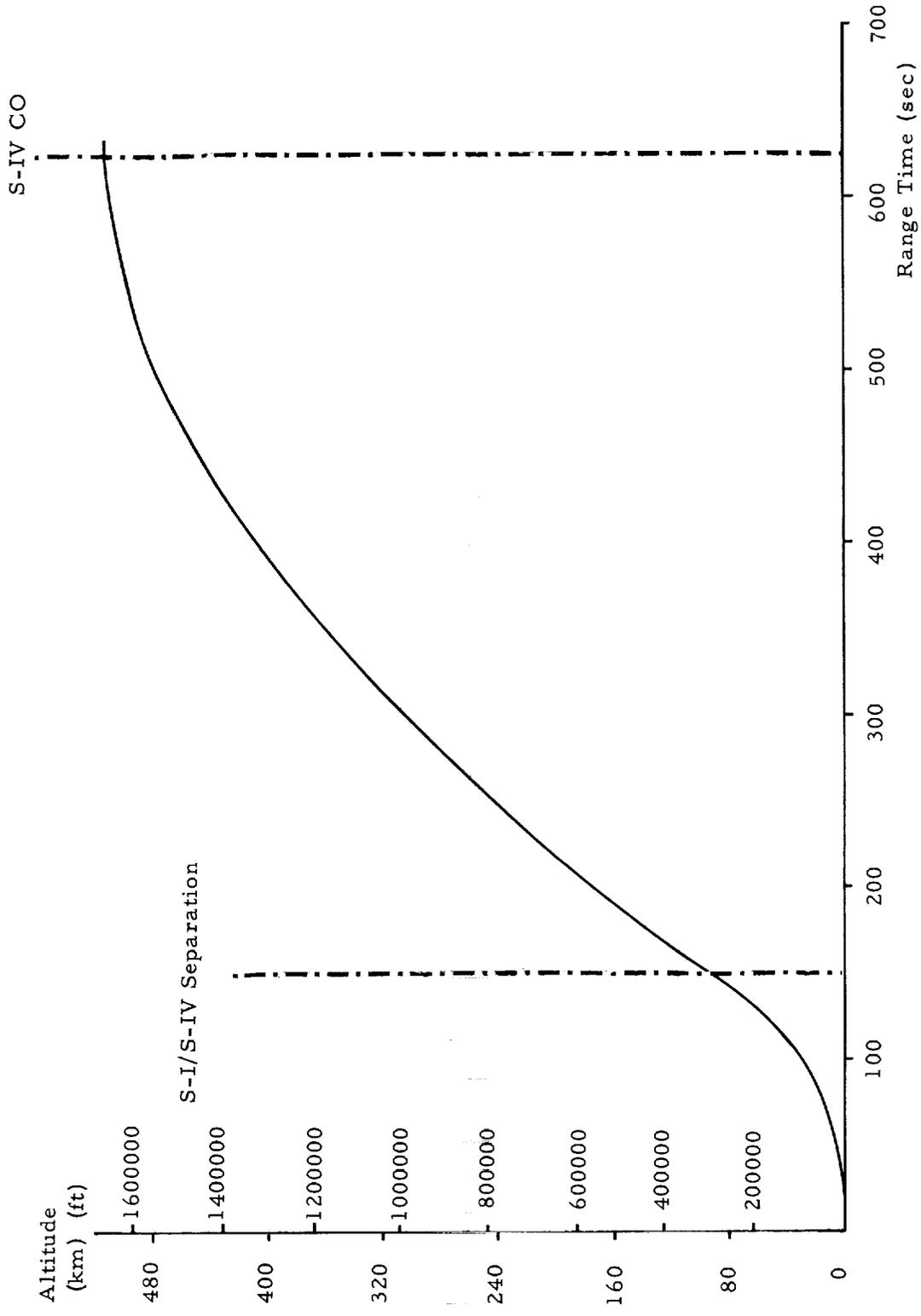


FIGURE 10. ALTITUDE

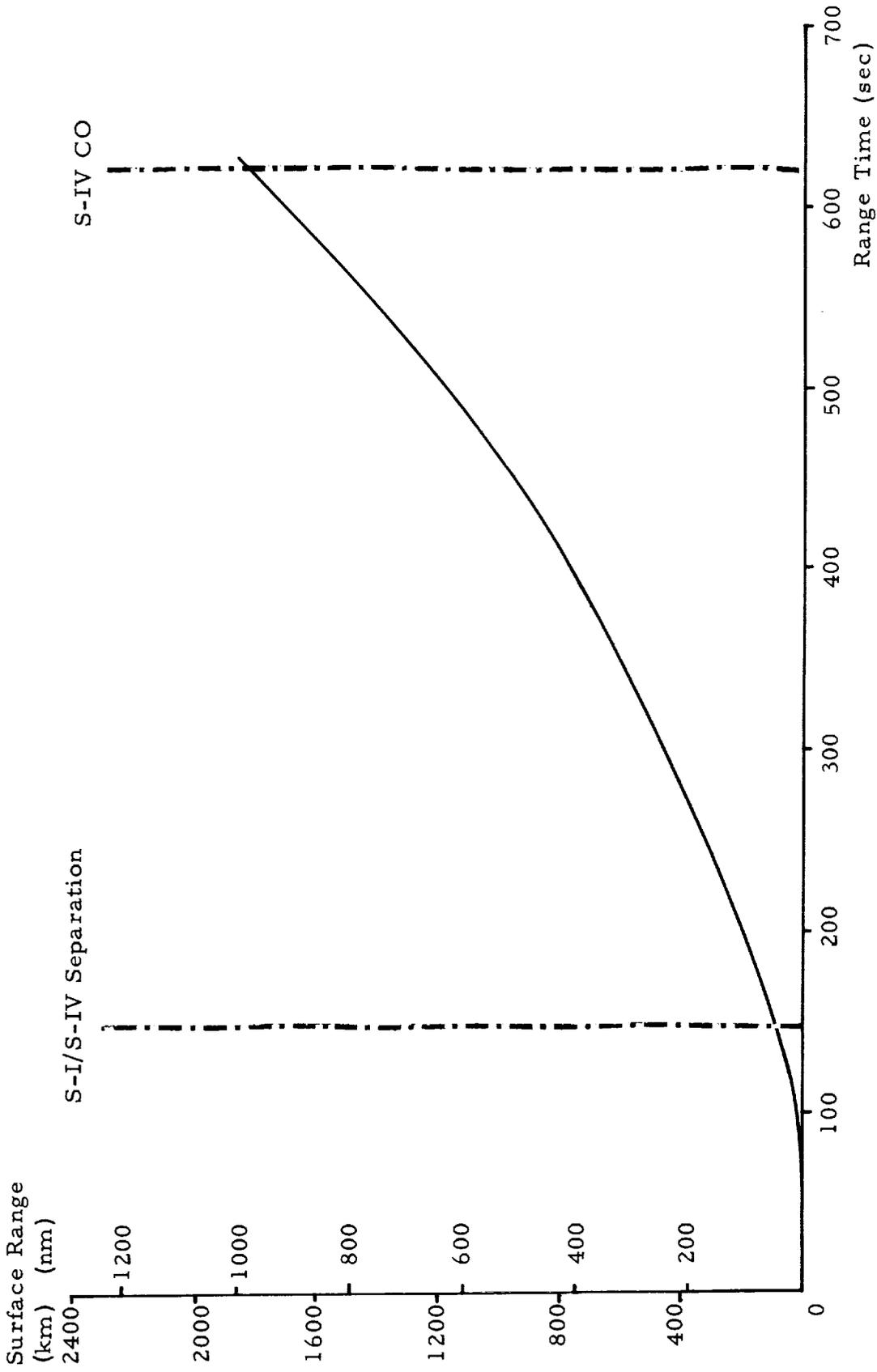


FIGURE 11. SURFACE RANGE

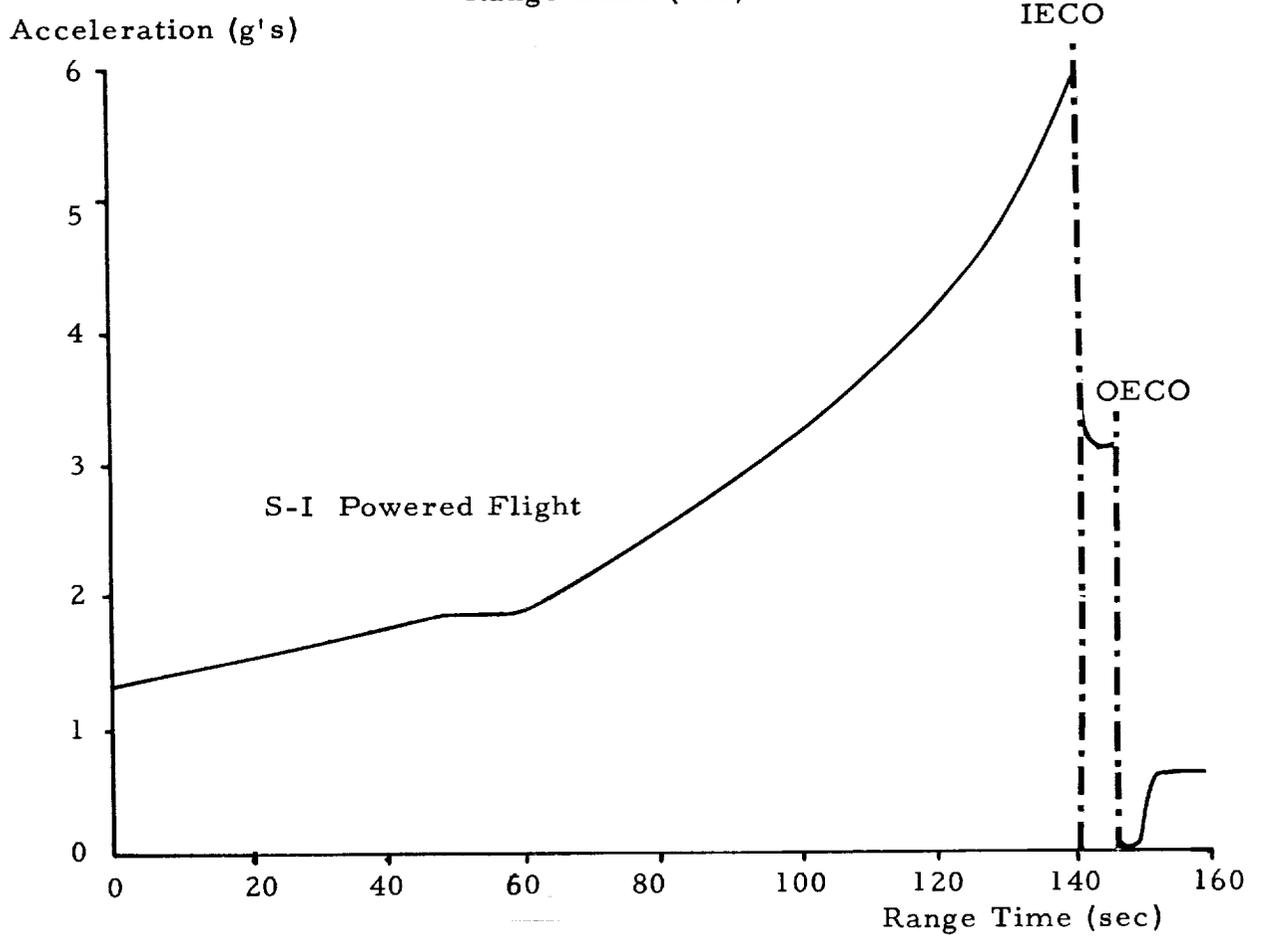
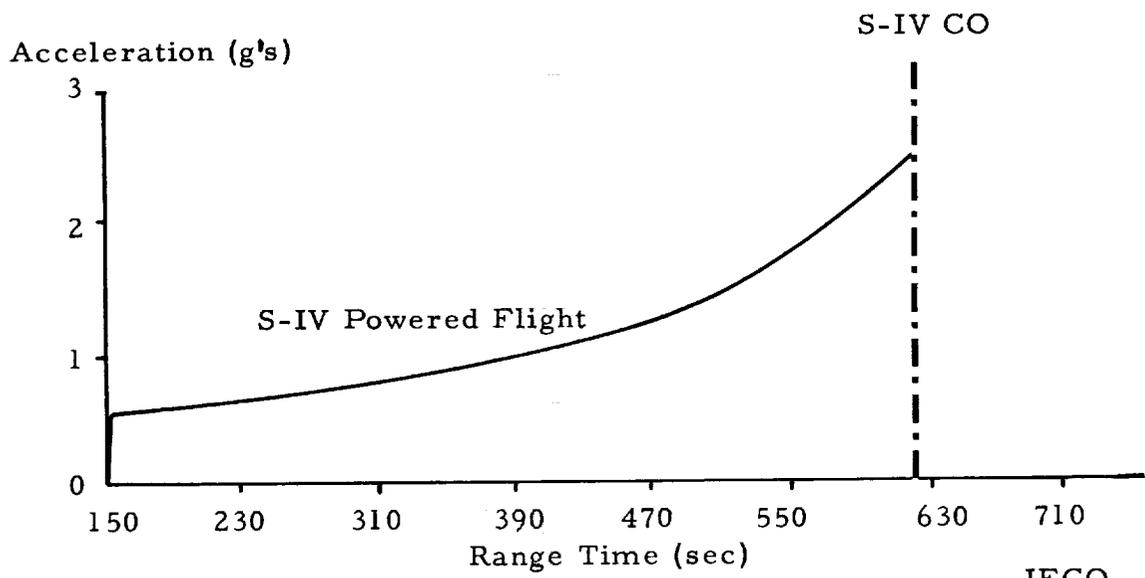


FIGURE 12. TOTAL INERTIAL ACCELERATION

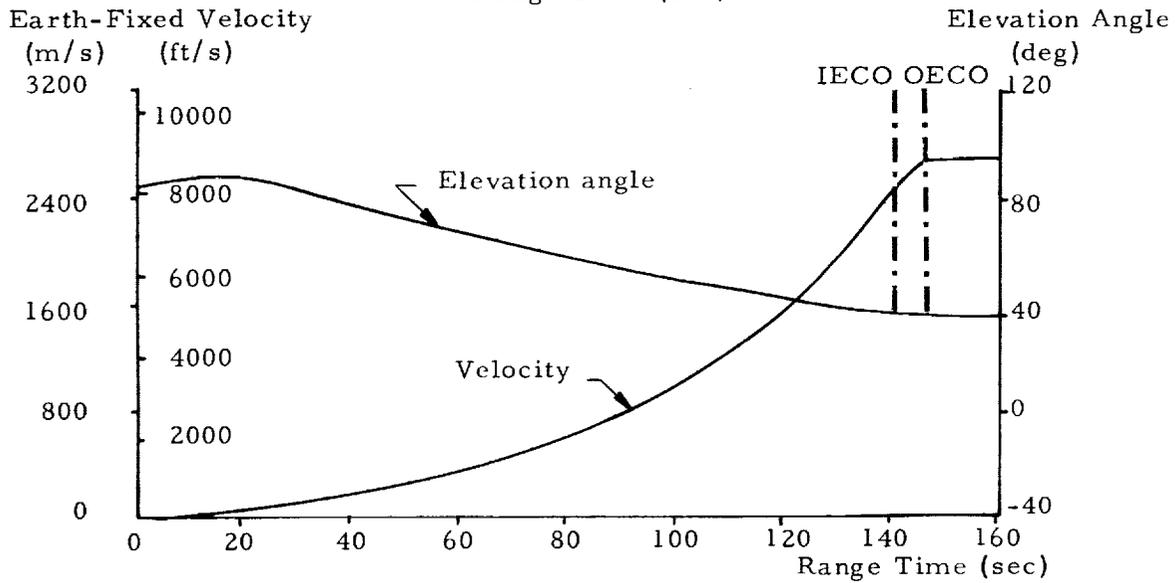
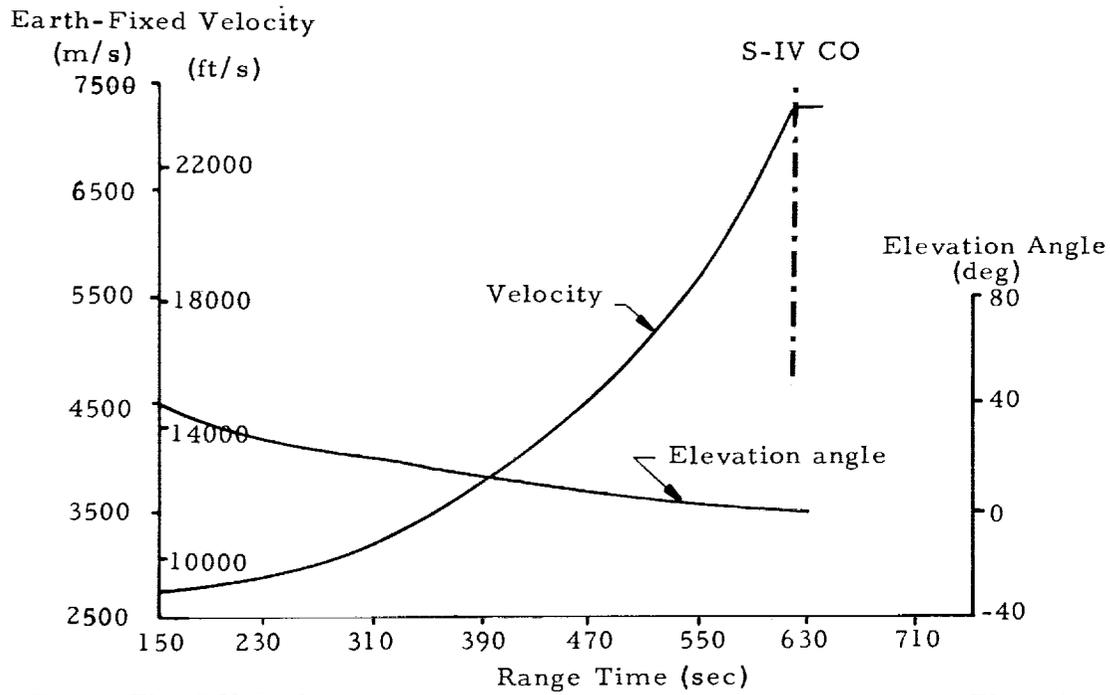


FIGURE 13. EARTH-FIXED VELOCITY AND ELEVATION ANGLE

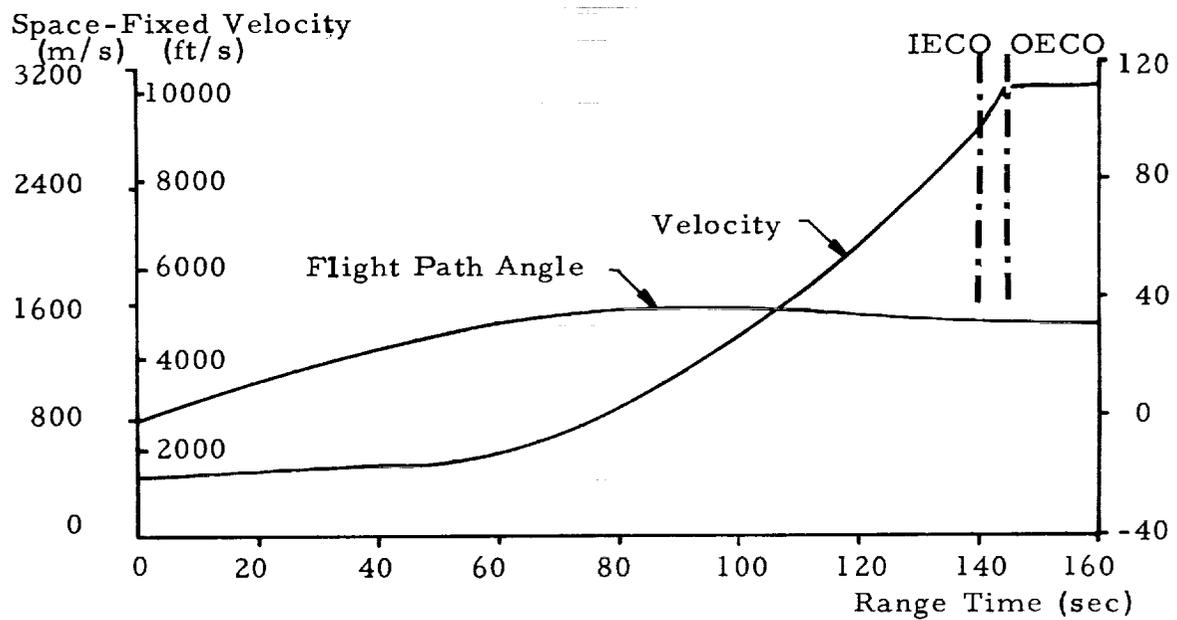
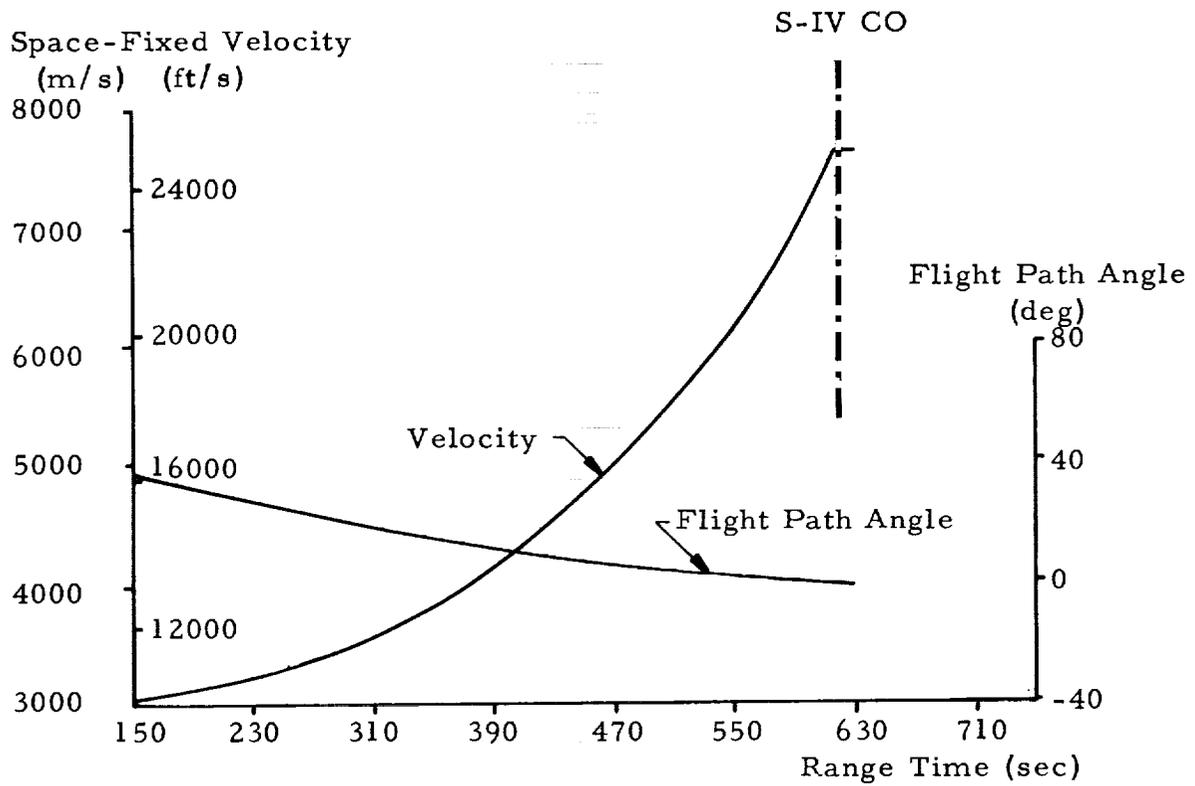


FIGURE 14. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE

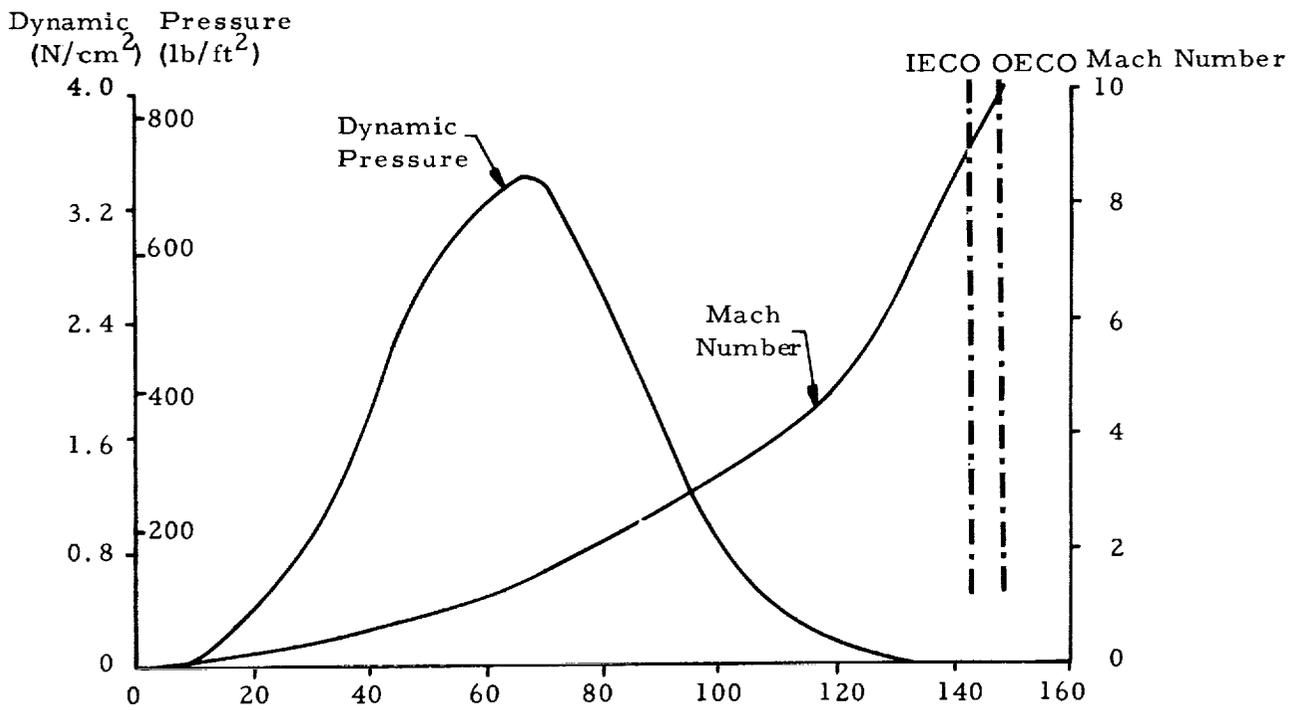


FIGURE 15. MACH NUMBER AND DYNAMIC PRESSURE

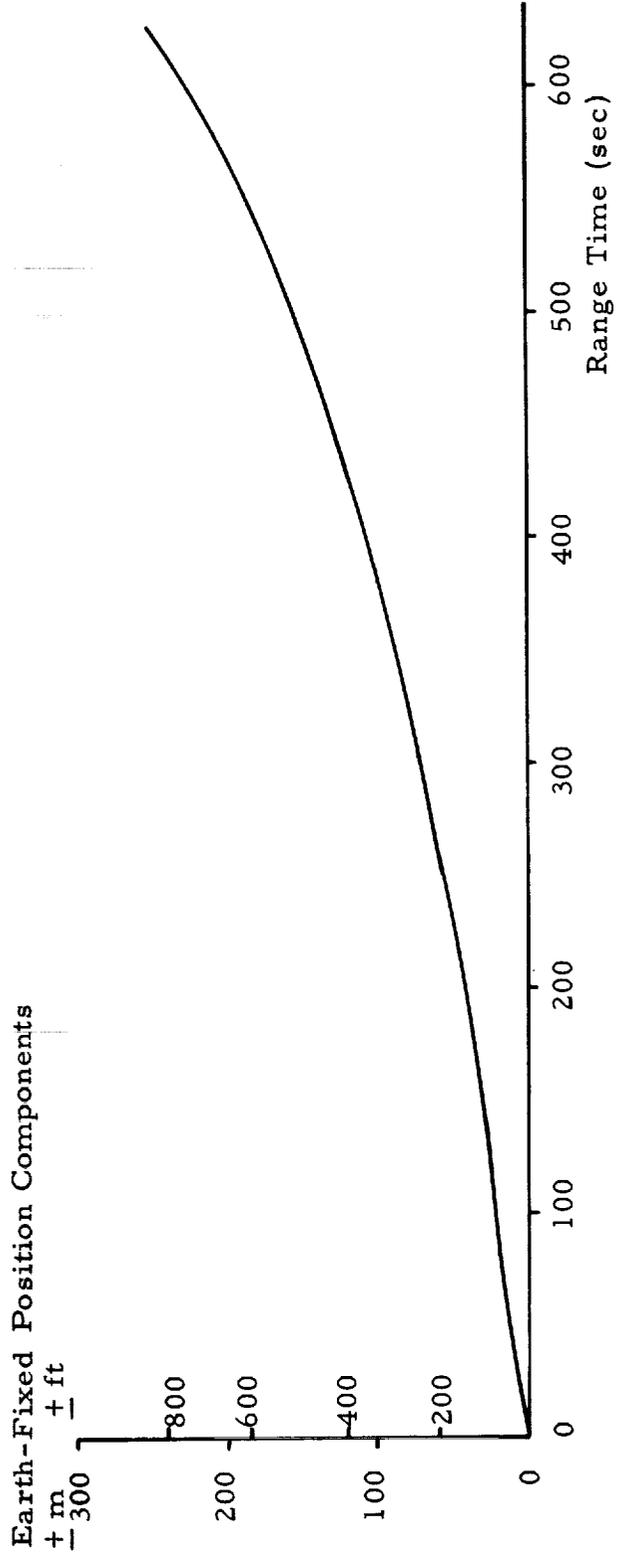
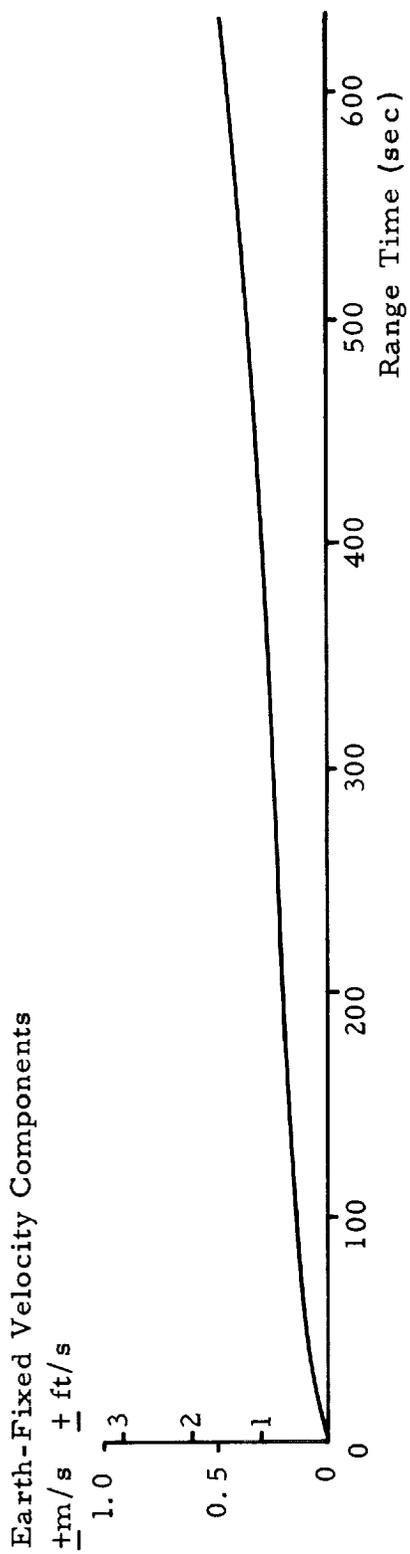


FIGURE 16. ESTIMATED UNCERTAINTY OF REFERENCE TRAJECTORY

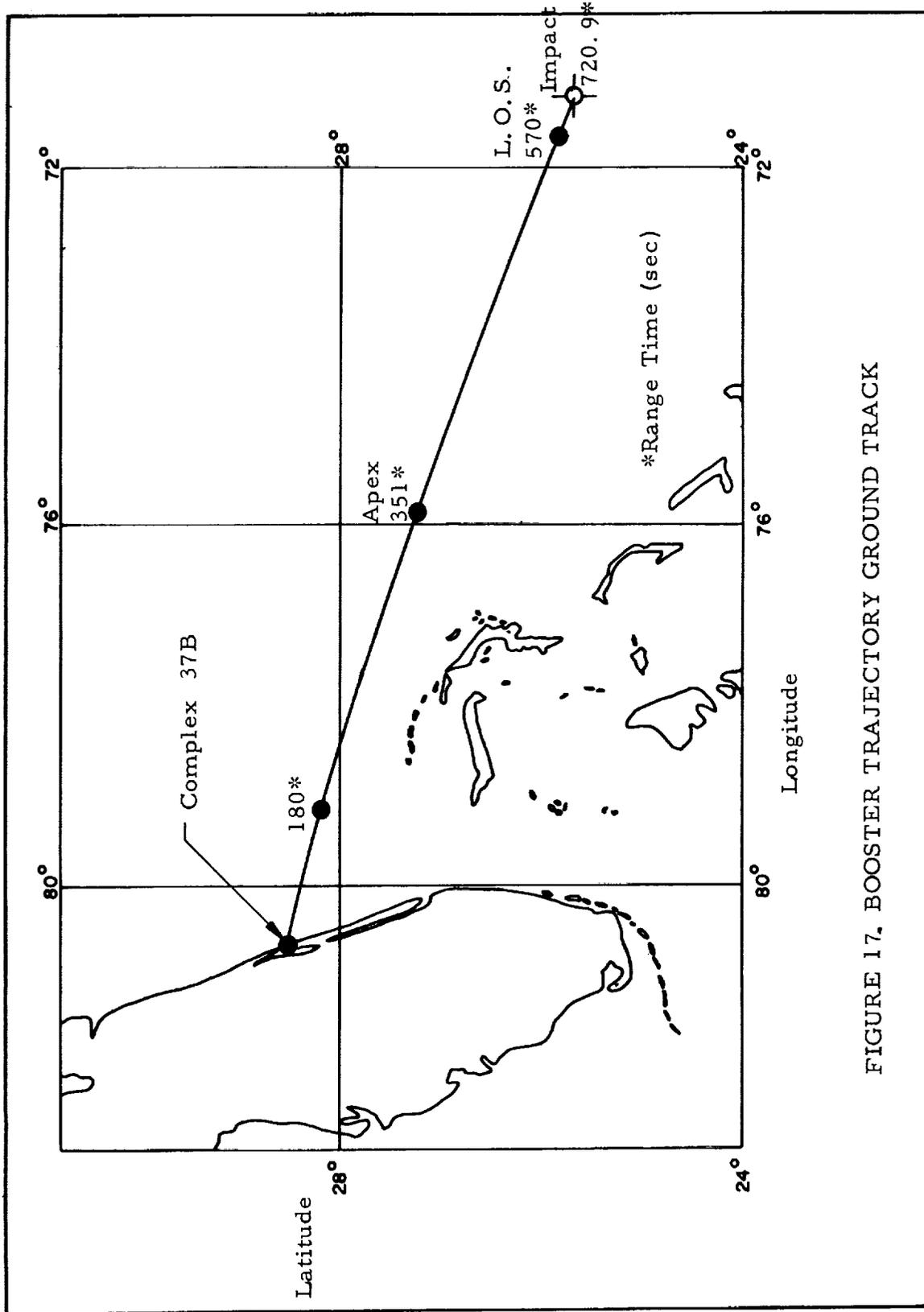


FIGURE 17. BOOSTER TRAJECTORY GROUND TRACK

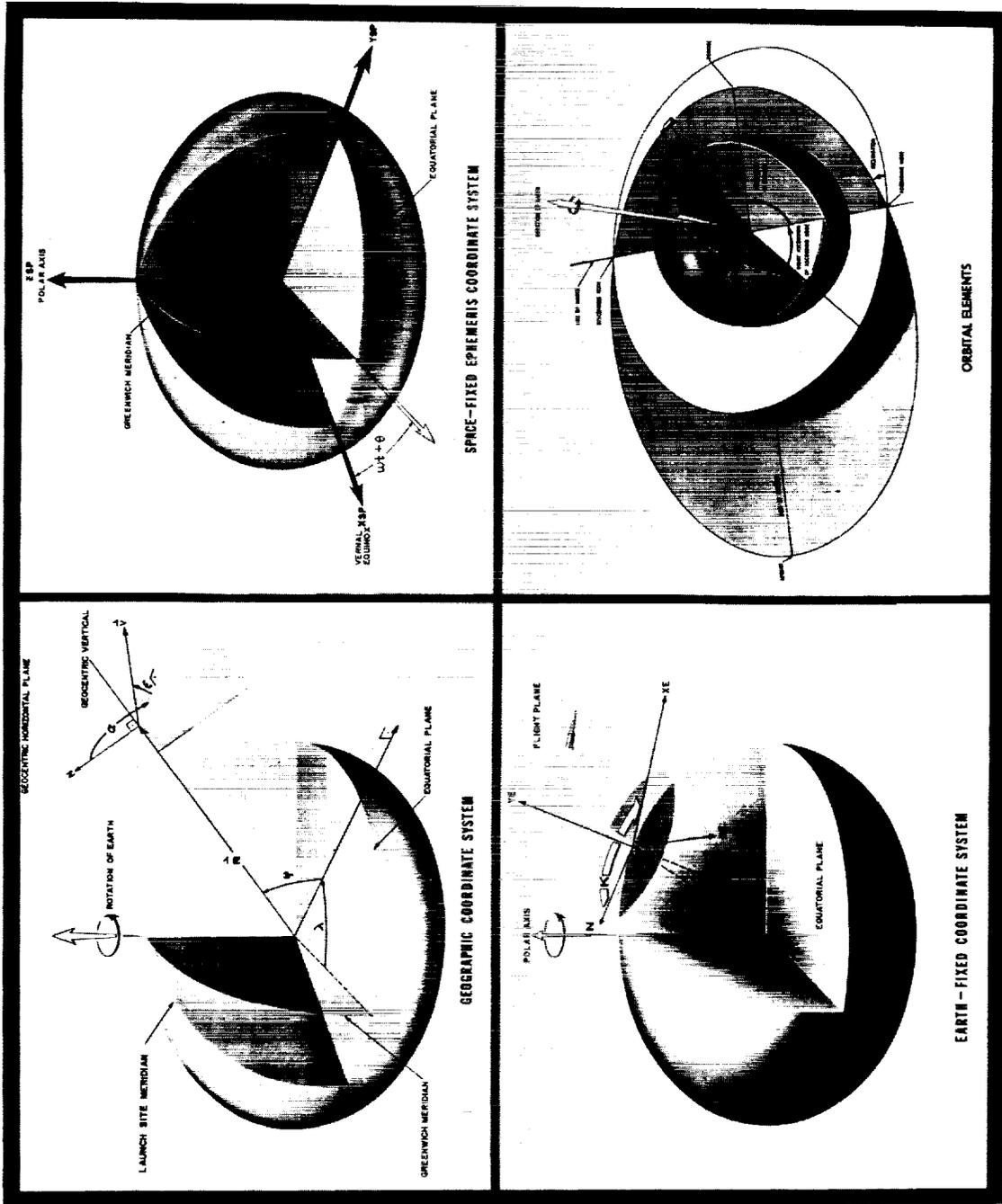


FIGURE 18. TRAJECTORY COORDINATE SYSTEMS

TABLE I
TRACKING DATA SOURCES (POWERED FLIGHT)

<u>Data Source</u>	<u>Time Available (sec)</u>
Fixed Camera	1.7 - 22.6
Theodolite	5.0 - 82.4
GLOTRAC Station I (MARK II AZUSA)	12.2 - 149.2 153.4 - 634.0
ODOP	0.5 - 119.4 126.6 - 148.8 180.1 - 634.0
MISTRAM	50.0 - 148.4 155.0 - 357.8 360.0 - 366.8 370.0 - 634.0
GLOTRAC	25.3 - 634.0
Radar Altimeter	160.0 - 215.0 418.0 - 522.0
Merritt Island (19.18) Radar (TPQ-18)	14.0 - 634.0
Grand Bahama (3.16) Radar (FPS-16)	72.5 - 465.2
Grand Bahama (3.18) Radar (TPQ-18)	93.0 - 634.0
Grand Turk (7.18) Radar (TPQ-18)	173.7 - 634.0
Antigua (91.18) Radar (FPQ-6)	337.9 - 634.0
Patrick (0.18) Radar (FPQ-6)	19.0 - 148.0

TABLE II
TIMES OF EVENTS

<u>Event</u>	<u>Range Time</u>		
	<u>Actual</u>	<u>Nominal</u>	<u>Act-Nom</u>
First Motion	-0.18		
Liftoff Signal (Umb Disc)	.08		
Guidance Detects Liftoff	0.11		
Pitch Command	8.65	8.65	0.00
Roll Command	8.66	8.66	0.00
Roll Completed	23.66	23.66	0.00
Lock Modules	138.36	138.36	0.00
Inboard Engine Cutoff	142.00	143.61	-1.61
Outboard Engine Cutoff	148.05	149.61	-1.56
Ullage Rockets Ignite	148.82	150.31	-1.49
Separation	148.92	150.41	-1.49
S-IV Ignition	150.62	152.11	-1.49
Jettison Ullage Rockets and LES	160.92	162.41	-1.49
Introduce Guidance	166.69	168.21	-1.52
Guidance Cutoff Signal	624.15	628.40	-4.25
Apollo Shroud Separation	805.97	810.19	-4.22
Wing Deployment Complete	905.87	910.09	-4.22

TABLE III
SIGNIFICANT TRAJECTORY PARAMETERS

Event	<u>Parameter</u>	<u>Actual</u>
First Motion	Range Time	-0.18 sec
	Total Inertial Acceleration	12.83 m/s ² (42.09 ft/s ²)
Mach One	Range Time	54.006 sec
	Altitude	7.17 km (13279 ft)
Maximum Dynamic Pressure	Range Time	67.0 sec
	Dynamic Pressure	3.371 N/cm ² (704.1 lb/ft ²)
	Altitude	11.75 km (21761 ft)
Maximum Total Inertial Acceleration (S-I Stage)	Range Time	142.15 sec
	Acceleration	60.03 m/s ² (196.95 ft/s ²)
Maximum Earth-Fixed Velocity (S-I Stage)	Range Time	148.40 sec
	Velocity	2725.1 m/s (8940.6 ft/s)
Apex (S-I Stage)	Range Time	351.0 sec
	Altitude	258.27 km (478316 ft)
	Range	487.37 km (263.18 nm)
	Earth-Fixed Velocity	2049.2 m/s (6723.1 ft/s)
Loss of Telemetry (S-I Stage)	Range Time	570.0 sec
	Altitude	60.29 km (111657 ft)
	Range	929.18 km (501.76 nm)
	Total Inertial Acceleration Elevation Angle From Pad	-16.16 m/s ² (53.02 ft/s ²) - 0.48 deg

TABLE III (CONT'D)
SIGNIFICANT TRAJECTORY PARAMETERS

Event	<u>Parameter</u>	<u>Actual</u>
Impact (S-I Stage)	Range Time	720.9 sec
	Range	980.85 km (529.66 nm)
	Cross Range	24.56 km (13.26 nm)
	Geodetic Latitude	25.7040 deg
	Longitude	71.1870 deg
Maximum Total Inertial Acceleration (S-IV Stage)	Range Time	624.20 sec
	Acceleration	25.78 m/s ² (84.58 ft/s ²)
Maximum Earth-Fixed Velocity (S-IV Stage)	Range Time	624.50 sec
	Velocity	7249.7 m/s (23785.1 ft/s)

TABLE IV
CUTOFF CONDITIONS

<u>Parameter</u>	<u>IECO</u>	<u>OECO</u>	<u>S-IV C0 (Guidance Signal)</u>
Range Time	142.00 sec	148.05 sec	624.151 sec
Altitude	79.19 km (42.76 nm)	89.21 km (48.17 nm)	509.66 km (275.18 nm)
Range	67.17 km (36.27 nm)	79.49 km (42.92 nm)	1849.70 km (998.76 nm)
Cross Range, ZE	0.55 km (0.30 nm)	0.67 km (0.36 nm)	51.10 km (27.59 nm)
Cross Range Velocity, DZE	18.9 m/s (62.0 ft/s)	21.3 m/s (69.9 ft/s)	228.7 m/s (750.3 ft/s)
Earth-Fixed Velocity	2562.8 m/s (8408.1 ft/s)	2722.4 m/s (8931.8 ft/s)	7247.0 m/s (23776.0 ft/s)
Earth-Fixed Velocity Vector Elevation	39.205 deg	38.397 deg	0.003 deg
Earth-Fixed Velocity Vector Azimuth	105.732 deg	105.818 deg	114.406 deg
Space-Fixed Velocity	2885.3 m/s (9466.2 ft/s)	3047.9 m/s (9999.7 ft/s)	7671.6 m/s (25169.3 ft/s)
Total Inertial Acceleration	59.86 m/s ² (196.39 ft/s ²)	31.46 m/s ² (103.22 ft/s ²)	25.76 m/s ² (84.51 ft/s ²)

TABLE IV (CONT'D)
CUTOFF CONDITIONS

Earth-Fixed Velocity Accuracy	
OECC	$\pm 0.3 \text{ m/s}$ ($\pm 1.0 \text{ ft/s}$)
S-IV CO	$\pm 0.5 \text{ m/s}$ ($\pm 1.5 \text{ ft/s}$)
Altitude Accuracy	
OECC	$\pm 30 \text{ m}$ ($\pm 98 \text{ ft}$)
S-IV CO	$\pm 150 \text{ m}$ ($\pm 492 \text{ ft}$)

TABLE V
ORBITAL ELEMENTS AT INSERTION

Time	07:45:35.151 U. T.
Semi-Major Axis	7005.66 km (3782.75 nm)
Eccentricity	0.017272093
Inclination	31.7763 deg
Right Ascension of Ascending Node	157.9292 deg
Argument of Perigee	133.3470 deg
True Anomaly	0.4828 deg
Mean Sidereal Time, 0 hr U. T. May 25, 1965	242.370579 deg
Space-Fixed Velocity	7674.46 m/s (25178.62 ft/s)
Azimuth of Space-Fixed Velocity (CW from North)	113.2185 deg
Flight Path Angle	0.0082 deg
Altitude From Earth Center	6884.66 km (3717.72 nm)
Geocentric Latitude (North)	22.3270 deg
Longitude (East)	297.3165 deg

TABLE VI
ORBITAL INSERTION PARAMETERS

<u>Parameter</u>	<u>Actual</u>	<u>Nominal</u>	<u>Actual Minus Nominal</u>
Time of Orbital Insertion (Range Time)	634.151 sec	638.402 sec	-4.251 sec
Space-Fixed Velocity	7674.5 m/s (25178.8 ft/s)	7675.2 m/s (25181.1 ft/s)	-0.7 m/s (-2.3 ft/s)
Flight Path Angle	0.0082 deg	0.0003 deg	0.0079 deg
Altitude **	509.6 km (275.2 nm)	509.6 km (275.2 nm)	0.0 km (0.0 nm)
Surface Range	1916.8 km (1035.0 nm)	1923.5 km (1038.6 nm)	-6.7 km (-3.6 nm)
Apogee Altitude*	748.5 km (404.2 nm)	751.2 km (405.6 nm)	-2.7 km (-1.4 nm)
Perigee Altitude*	506.5 km (273.5 nm)	506.5 km (273.5 nm)	0.0 km (0.0 nm)
Period	97.3 min	97.3 min	0.0 min
Inclination	31.78 deg	31.76 deg	0.02 deg
Excess Circular Velocity	65.4 m/s (214.6 ft/s)	66.1 m/s (216.9 ft/s)	-0.7 m/s (-2.3 ft/s)
Lifetime	1220 days	1230 days	-10 days

* Apogee and perigee altitudes are defined assuming a spherical Earth of radius 6878.165 km (3443.9336 nm).
 ** Altitude is defined assuming an oblate Earth (Fischer Ellipsoid).

TABLE VII
INITIAL SA-8 ORBITAL TRACKING

<u>STATION</u>	<u>Revolution Number</u>					
	<u>Insertion</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<u>RADAR</u>						
Grand Bahama	B					
Merritt Island, Fla.	B	S				
Bermuda	B					
Grand Turk	B	S				
Antigua	B	S				
Ascension (TPQ-18)		B				
Ascension (FPS-16)		B				
Pretoria, South Africa		B*				
White Sands, N.M.		S				
<u>MINITRACK</u>						
Johannesburg, S. Africa		X	X	X	X	
Lima, Peru					X	
Quito, Ecuador				X		
Goldstone Lake, Calif.		X	X			
Fort Myers, Fla.		X				
Santiago, Chile					X	

*Last C-Band beacon reception at approximately 08:20 Z (45 min after liftoff).

B. C-Band radar beacon track.

S. C-Band radar skin track.

TABLE VIII
BOOSTER FREE FLIGHT TRAJECTORY

Time (sec)	Earth-Fixed Position			Earth-Fixed Velocity			Altitude (m)	Range (m)
	XE (m)	YE (m)	ZE (m)	DXE (m/s)	DYE (m/s)	DZE (m/s)		
160	106304	107838	935	2140	1544	24	108722	104450
180	149042	136881	1446	2133	1361	27	138599	132823
200	191626	162280	2034	2125	1179	31	165099	186703
220	234042	184064	2696	2116	999	35	188249	227252
240	276276	202260	3428	2107	821	38	208070	267488
260	318214	216891	4229	2097	643	42	224581	307461
280	360144	227976	5095	2086	466	45	237798	347222
300	401751	235530	6022	2075	290	48	247734	386818
320	443123	239565	7008	2063	114	51	254397	426298
340	484247	240089	8050	2050	-61	53	257794	465709
360	525108	237106	9143	2036	-237	56	257928	505098
380	565694	230619	10286	2022	-412	58	254800	544510
400	605989	220624	11474	2007	-588	60	248406	583993
420	645981	207115	12704	1992	-763	62	238740	623593
440	685654	190085	13972	1975	-940	64	225794	663359
460	724993	169518	15275	1958	-1117	66	209554	703338
480	763981	145401	16610	1940	-1295	67	190007	743580
500	802603	117711	17971	1922	-1474	69	167132	784138
520	840840	86426	19357	1902	-1655	70	140909	825062
540	878673	51517	20761	1881	-1837	71	111311	866409
560	916081	12955	22181	1859	-2020	71	78311	908234
580	952646	-28838	23597	1745	-2098	68	42271	950138
600	974825	-56888	24470	364	-530	15	17879	976197
620	977605	-62328	24583	43	-185	2	12928	979774
640	977981	-65719	24599	-5	-155	0	9620	980578
660	977653	-68584	24593	-16	-132	0	6753	980784
680	977316	-71054	24583	-17	-115	-1	4260	980831
700	976989	-73231	24573	-16	-103	0	2059	980843
720.9	976678	-75266	24564	-14	-93	0	0	980848

TABLE IX
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S
FIRST MOTION						
-0.180	0	32	0	-0.	0.	-0.
LIFTOFF SIGNAL						
0.078	0	32	0	0.0	0.8	0.0
1.0	0	34	0	0.1	3.8	0.1
2.0	0	40	0	0.1	7.2	0.1
3.0	0	49	0	0.0	10.8	0.1
4.0	0	61	0	-0.1	14.5	0.1
5.0	0	78	0	-0.2	18.3	0.0
6.0	0	98	0	-0.3	22.1	0.0
7.0	0	122	0	-0.4	26.0	0.0
8.0	-0	150	0	-0.5	30.0	-0.0
9.0	-0	182	0	-0.5	34.0	-0.0
10.0	-1	218	0	-0.6	38.2	-0.0
11.0	-2	258	1	-0.6	42.4	-0.1
12.0	-2	302	1	-0.6	46.6	-0.1
13.0	-3	351	0	-0.6	51.0	-0.1
14.0	-4	404	0	-0.6	55.5	-0.2
15.0	-4	462	0	-0.5	60.0	-0.3
16.0	-5	524	0	-0.4	64.7	-0.3
17.0	-5	591	-0	-0.2	69.4	-0.4
18.0	-5	663	-0	0.0	74.2	-0.4
19.0	-5	740	-1	0.4	79.1	-0.5
20.0	-5	822	-1	0.7	84.1	-0.5
21.0	-4	908	-2	1.2	89.2	-0.6
22.0	-2	1000	-2	1.8	94.3	-0.6
23.0	-0	1097	-3	2.5	99.5	-0.6
24.0	1	1199	-4	3.2	104.9	-0.6
25.0	5	1307	-4	4.1	110.3	-0.6
26.0	9	1420	-5	5.0	115.8	-0.6
27.0	15	1538	-5	6.0	121.4	-0.5
28.0	21	1662	-6	7.2	127.1	-0.5
29.0	29	1792	-6	8.4	133.0	-0.5
30.0	38	1928	-7	9.8	138.9	-0.4

TABLE IX
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S
31.0	48	2070	-7	11.4	144.9	-0.3
32.0	60	2218	-7	13.1	150.9	-0.2
33.0	74	2372	-7	15.0	157.1	-0.1
34.0	90	2532	-7	17.1	163.3	0.1
35.0	108	2699	-7	19.3	169.7	0.3
36.0	129	2872	-7	21.7	176.1	0.4
37.0	151	3051	-6	24.2	182.6	0.5
38.0	177	3237	-6	26.8	189.2	0.6
39.0	205	3429	-5	29.6	195.9	0.7
40.0	236	3629	-4	32.5	202.7	0.8
41.0	270	3835	-3	35.7	209.5	0.9
42.0	307	4048	-2	39.1	216.5	1.1
43.0	347	4268	-1	42.7	223.5	1.3
44.0	392	4495	-0	46.6	230.6	1.5
45.0	440	4729	1	50.6	237.8	1.7
46.0	493	4970	3	54.9	244.9	1.8
47.0	550	5219	5	59.3	252.2	1.8
48.0	611	5475	7	63.7	259.6	1.8
49.0	677	5738	9	68.5	267.1	2.0
50.0	748	6009	11	73.4	274.6	2.0
51.0	824	6287	13	78.5	282.2	2.0
52.0	905	6573	15	83.7	289.8	2.0
53.0	991	6867	17	88.8	297.4	1.8
54.0	1082	7168	18	94.2	304.8	1.6
MACH ONE						
54.006	1083	7169	18	94.2	304.9	1.6
55.0	1179	7476	20	99.5	312.1	1.3
56.0	1281	7792	21	105.1	319.2	1.3
57.0	1389	8114	23	111.1	326.1	1.4
58.0	1503	8444	24	117.3	333.2	1.5
59.0	1624	8780	26	123.9	340.4	1.6
60.0	1751	9124	28	130.5	347.6	1.6
61.0	1885	9476	29	137.6	354.9	1.5
62.0	2026	9834	31	144.9	362.4	1.4
63.0	2174	10201	32	152.6	370.1	1.2
64.0	2331	10575	33	160.6	377.9	0.9
65.0	2495	10957	34	168.8	385.9	0.7

TABLE IX
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S
66.0	2668	11347	35	177.3	394.0	0.6
MAXIMUM DYNAMIC PRESSURE						
67.000	2850	11745	35	186.0	402.4	0.6
68.0	3040	12152	36	195.0	411.0	0.7
69.0	3240	12567	37	204.3	419.7	0.8
70.0	3448	12991	38	213.9	428.6	1.1
71.0	3667	13424	39	223.8	437.6	1.3
72.0	3896	13867	40	234.0	446.9	1.5
73.0	4135	14318	42	244.6	456.3	1.7
74.0	4385	14779	44	255.6	465.8	1.8
75.0	4646	15250	46	266.8	475.6	2.0
76.0	4918	15731	48	278.4	485.6	2.2
77.0	5203	16222	50	290.3	495.8	2.4
78.0	5499	16723	53	302.4	506.2	2.6
79.0	5807	17234	55	314.9	516.8	2.6
80.0	6128	17757	58	327.7	527.6	2.6
81.0	6463	18290	60	340.9	538.6	2.5
82.0	6810	18834	63	354.4	549.8	2.5
83.0	7171	19390	65	368.3	561.2	2.5
84.0	7547	19957	68	382.6	572.7	2.6
85.0	7936	20535	71	397.2	584.5	2.7
86.0	8341	21126	73	412.2	596.4	2.7
87.0	8761	21729	76	427.6	608.5	2.8
88.0	9196	22343	79	443.4	620.8	2.9
89.0	9647	22971	82	459.6	633.3	2.9
90.0	10115	23610	85	476.2	645.9	3.0
91.0	10600	24263	88	493.1	658.7	3.0
92.0	11101	24928	91	510.5	671.7	3.1
93.0	11621	25606	94	528.2	684.8	3.1
94.0	12158	26298	97	546.4	698.0	3.2
95.0	12713	27003	101	565.0	711.4	3.3
96.0	13288	27721	104	584.0	725.0	3.5
97.0	13881	28453	108	603.4	738.7	3.7
98.0	14495	29199	111	623.2	752.6	3.9
99.0	15127	29958	115	643.5	766.6	4.0
100.0	15780	30731	119	664.1	780.9	4.2
101.0	16454	31518	123	685.1	795.3	4.3

TABLE IX
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S
102.0	17150	32321	127	706.5	809.9	4.5
103.0	17867	33138	131	728.4	824.6	4.6
104.0	18607	33970	136	750.7	839.5	4.8
105.0	19369	34817	141	773.4	854.5	5.0
106.0	20153	35680	146	796.6	869.8	5.2
107.0	20962	36557	151	820.2	885.2	5.4
108.0	21794	37450	157	844.2	900.9	5.6
109.0	22650	38359	163	868.7	916.7	5.9
110.0	23531	39284	169	893.7	932.8	6.1
111.0	24438	40225	175	919.1	949.0	6.3
112.0	25370	41183	181	945.0	965.5	6.6
113.0	26328	42156	188	971.4	982.2	6.9
114.0	27313	43147	195	998.3	999.1	7.2
115.0	28325	44155	202	1025.7	1016.2	7.5
116.0	29364	45180	210	1053.6	1033.5	7.8
117.0	30432	46222	218	1082.0	1051.1	8.1
118.0	31528	47282	226	1111.0	1068.9	8.5
119.0	32654	48360	235	1140.5	1087.0	8.8
120.0	33810	49457	244	1170.5	1105.3	9.2
121.0	34995	50571	253	1201.1	1123.9	9.5
122.0	36212	51705	263	1232.3	1142.8	9.9
123.0	37460	52857	273	1264.1	1161.9	10.3
124.0	38741	54029	284	1296.5	1181.4	10.7
125.0	40054	55220	295	1329.5	1201.2	11.1
126.0	41400	56432	306	1363.2	1221.3	11.5
127.0	42780	57663	318	1397.5	1241.7	11.9
128.0	44195	58916	330	1432.5	1262.5	12.3
129.0	45646	60189	342	1468.2	1283.6	12.8
130.0	47132	61483	355	1504.5	1305.0	13.2
131.0	48655	62799	369	1541.6	1326.9	13.6
132.0	50216	64137	382	1579.5	1349.1	14.0
133.0	51815	65498	397	1618.1	1371.7	14.5
134.0	53453	66881	411	1657.6	1394.8	14.9
135.0	55130	68288	426	1697.8	1418.3	15.4
136.0	56849	69718	442	1739.1	1442.2	15.8
137.0	58609	71173	458	1781.0	1466.6	16.3
138.0	60411	72652	475	1823.8	1491.5	16.7
139.0	62257	74156	492	1867.5	1517.0	17.3
140.0	64147	75686	509	1912.1	1543.1	17.8
141.0	66081	77243	527	1957.7	1569.9	18.3

TABLE IX
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S
INBOARD ENGINE CUTOFF						
142.000	68062	78827	546	2004.0	1597.4	18.9
143.0	70084	80434	565	2034.5	1612.5	19.4
144.0	72131	82052	585	2058.9	1622.7	19.7
145.0	74202	83679	605	2082.6	1632.4	20.1
146.0	76297	85317	625	2106.4	1642.1	20.5
147.0	78416	86964	646	2130.5	1652.1	20.9
148.0	80558	88622	667	2154.5	1662.0	21.3
OUTBOARD ENGINE CUTOFF						
148.050	80666	88705	668	2155.7	1662.5	21.3
149.0	82718	90283	688	2160.7	1657.9	21.5
150.0	84879	91937	710	2161.3	1649.4	21.7
155.0	95708	100090	820	2175.5	1615.6	22.7
160.0	106648	108107	936	2200.0	1590.3	23.8
165.0	117714	116001	1056	2224.9	1565.9	24.9
GUIDANCE INITIATION						
166.690	121481	118640	1099	2233.4	1557.7	25.2
170.0	128901	123769	1183	2249.9	1541.8	26.0
175.0	140211	131422	1317	2273.7	1519.7	27.5
180.0	151637	138968	1458	2296.8	1498.7	29.0
185.0	163180	146408	1607	2320.6	1477.4	30.5
190.0	174844	153741	1763	2345.0	1455.9	32.0
195.0	186631	160967	1927	2369.9	1434.3	33.4
200.0	198544	168084	2097	2395.3	1412.6	34.9
205.0	210585	175093	2275	2421.1	1390.9	36.3
210.0	222756	181994	2460	2447.3	1369.2	37.8
215.0	235059	188785	2652	2473.9	1347.5	39.1
220.0	247496	195468	2853	2501.0	1325.7	40.6
225.0	260069	202042	3059	2528.6	1303.9	42.0
230.0	272782	208507	3272	2556.6	1281.9	43.4
235.0	285637	214861	3492	2585.2	1259.9	44.8

TABLE IX
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S
240.0	298635	221105	3720	2614.2	1237.7	46.2
245.0	311779	227238	3955	2643.6	1215.4	47.7
250.0	325072	233259	4197	2673.5	1192.9	49.1
255.0	338514	239168	4446	2703.8	1170.4	50.6
260.0	352110	244963	4702	2734.5	1147.7	52.1
265.0	365861	250644	4966	2765.8	1124.8	53.6
270.0	379769	256210	5238	2797.5	1101.8	55.1
275.0	393837	261661	5518	2829.8	1078.4	56.7
280.0	408068	266995	5805	2862.6	1055.0	58.1
285.0	422464	272211	6099	2895.8	1031.5	59.8
290.0	437027	277310	6402	2929.6	1007.8	61.3
295.0	451760	282289	6712	2963.9	983.8	62.9
300.0	466667	287147	7031	2998.8	959.5	64.6
305.0	481749	291884	7358	3034.3	935.1	66.3
310.0	497011	296497	7694	3070.3	910.3	67.9
315.0	512454	300987	8037	3107.0	885.3	69.6
320.0	528082	305350	8389	3144.2	860.1	71.3
325.0	543897	309587	8750	3182.0	834.7	73.1
330.0	559903	313697	9120	3220.4	808.9	74.9
335.0	576102	317676	9499	3259.5	782.6	76.6
340.0	592498	321523	9886	3299.1	756.2	78.4
345.0	609094	325238	10283	3339.3	729.7	80.3
350.0	625893	328819	10689	3380.2	702.6	82.2
355.0	642898	332263	11105	3421.6	675.2	84.1
360.0	660111	335570	11531	3463.8	647.4	86.1
365.0	677536	338737	11966	3506.5	619.1	88.0
370.0	695177	341761	12411	3549.9	590.4	90.0
375.0	713036	344640	12865	3593.9	561.3	91.9
380.0	731117	347373	13330	3638.6	531.8	94.0
385.0	749423	349957	13805	3684.0	501.7	96.0
390.0	767958	352390	14290	3730.1	471.2	98.1
395.0	786725	354668	14786	3776.9	439.9	100.1
400.0	805728	356789	15292	3824.4	408.3	102.3
405.0	824970	358750	15808	3872.6	376.2	104.4
410.0	844456	360550	16336	3921.5	343.4	106.6
415.0	864187	362184	16874	3971.2	310.1	108.8
420.0	884169	363650	17424	4021.6	276.1	111.0
425.0	904405	364944	17984	4072.8	241.5	113.2
430.0	924898	366064	18556	4124.8	206.3	115.4
435.0	945653	367006	19139	4177.5	170.4	117.7

TABLE IX
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S
440.0	966675	367767	19733	4231.0	133.8	120.1
445.0	987965	368342	20339	4285.4	96.3	122.4
450.0	1009530	368729	20957	4340.5	58.1	124.8
455.0	1031372	368922	21587	4396.6	19.2	127.1
460.0	1053496	368919	22228	4453.4	-20.6	129.6
465.0	1075907	368714	22882	4511.0	-61.3	132.0
470.0	1098608	368305	23549	4569.5	-102.8	134.6
475.0	1121604	367685	24228	4628.9	-145.3	137.1
480.0	1144899	366851	24920	4689.1	-188.7	139.7
485.0	1168497	365797	25625	4750.4	-233.0	142.3
490.0	1192404	364519	26342	4812.6	-278.3	144.9
495.0	1216625	363012	27073	4875.8	-324.7	147.6
500.0	1241164	361270	27818	4940.0	-372.3	150.2
505.0	1266026	359287	28576	5005.2	-421.0	153.0
510.0	1291218	357058	29347	5071.4	-470.7	155.6
515.0	1316743	354577	30133	5138.8	-521.9	158.5
520.0	1342607	351837	30933	5207.1	-574.2	161.4
525.0	1368816	348833	31747	5276.6	-627.8	164.2
530.0	1395375	345557	32575	5347.2	-682.7	167.1
535.0	1422290	342003	33418	5419.0	-739.1	170.1
540.0	1449567	338163	34276	5492.0	-797.0	173.0
545.0	1477213	334030	35148	5566.2	-856.5	176.0
550.0	1505232	329596	36036	5641.8	-917.6	179.1
555.0	1533632	324852	36939	5718.6	-980.3	182.2
560.0	1562420	319790	37857	5796.8	-1044.8	185.3
565.0	1591603	314401	38792	5876.4	-1111.2	188.5
570.0	1621187	308674	39742	5957.4	-1179.6	191.6
575.0	1651180	302601	40708	6040.0	-1250.0	194.8
580.0	1681589	296171	41690	6124.1	-1322.5	198.1
585.0	1712423	289371	42689	6209.5	-1397.7	201.4
590.0	1743688	282191	43704	6296.6	-1475.0	204.7
595.0	1775392	274617	44736	6385.2	-1555.0	208.1
600.0	1807543	266636	45785	6475.6	-1637.6	211.6
605.0	1840151	258236	46852	6567.7	-1723.0	215.0
610.0	1873224	249402	47936	6662.0	-1811.0	218.6
615.0	1906774	240121	49038	6758.3	-1901.9	222.1
620.0	1940808	230377	50158	6856.1	-1996.7	225.7

S-IV GUIDANCE CUTOFF

624.151	1969437	221919	51101	6938.7	-2078.8	228.7
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TABLE IX
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S
625.0	1975329	220150	51296	6939.3	-2086.4	229.0
630.0	2009997	209627	52445	6928.5	-2122.3	230.8
INSERTIØN						
634.151	2038737	200755	53405	6919.3	-2152.0	232.2

TABLE X
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S
FIRST MOTION						
-0.180	573.579	-5578.449	3028.450	406.8	41.8	0.
LIFTOFF SIGNAL						
0.078	573.683	-5578.438	3028.450	406.9	41.1	0.3
1.0	574.059	-5578.401	3028.451	407.2	38.5	1.7
2.0	574.466	-5578.364	3028.453	407.5	35.5	3.3
3.0	574.874	-5578.330	3028.457	407.8	32.4	5.1
4.0	575.282	-5578.299	3028.463	408.0	29.2	6.9
5.0	575.690	-5578.272	3028.471	408.2	26.0	8.7
6.0	576.098	-5578.247	3028.481	408.5	22.7	10.6
7.0	576.507	-5578.226	3028.492	408.8	19.3	12.5
8.0	576.916	-5578.209	3028.506	409.0	15.9	14.4
9.0	577.325	-5578.194	3028.521	409.3	12.4	16.4
10.0	577.734	-5578.184	3028.538	409.7	8.8	18.4
11.0	578.144	-5578.177	3028.558	410.0	5.2	20.4
12.0	578.554	-5578.174	3028.579	410.4	1.5	22.5
13.0	578.965	-5578.174	3028.603	410.8	-2.3	24.6
14.0	579.376	-5578.178	3028.628	411.3	-6.1	26.8
15.0	579.787	-5578.186	3028.656	411.8	-10.1	29.0
16.0	580.199	-5578.198	3028.686	412.3	-14.1	31.3
17.0	580.612	-5578.214	3028.719	413.0	-18.1	33.5
18.0	581.025	-5578.234	3028.754	413.7	-22.3	35.8
19.0	581.439	-5578.259	3028.791	414.4	-26.5	38.1
20.0	581.854	-5578.287	3028.830	415.3	-30.8	40.5
21.0	582.269	-5578.320	3028.871	416.2	-35.2	42.8
22.0	582.686	-5578.358	3028.916	417.3	-39.7	45.2
23.0	583.104	-5578.400	3028.962	418.4	-44.2	47.5
24.0	583.523	-5578.446	3029.011	419.6	-48.8	49.9
25.0	583.943	-5578.497	3029.062	421.0	-53.6	52.3
26.0	584.364	-5578.553	3029.115	422.4	-58.4	54.7
27.0	584.788	-5578.614	3029.171	423.9	-63.3	57.1
28.0	585.212	-5578.680	3029.229	425.5	-68.3	59.5
29.0	585.639	-5578.751	3029.290	427.3	-73.4	62.0
30.0	586.066	-5578.827	3029.353	429.2	-78.6	64.5

TABLE X
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S
31.0	586.497	-5578.908	3029.419	431.3	-83.9	66.9
32.0	586.929	-5578.995	3029.487	433.5	-89.3	69.3
33.0	587.363	-5579.087	3029.558	435.9	-94.7	71.7
34.0	587.801	-5579.184	3029.630	438.5	-100.3	74.1
35.0	588.240	-5579.287	3029.706	441.2	-105.9	76.4
36.0	588.683	-5579.396	3029.783	444.1	-111.6	78.8
37.0	589.128	-5579.510	3029.863	447.2	-117.3	81.2
38.0	589.577	-5579.631	3029.946	450.3	-123.2	83.7
39.0	590.029	-5579.757	3030.031	453.7	-129.1	86.2
40.0	590.484	-5579.889	3030.118	457.1	-135.1	88.7
41.0	590.943	-5580.027	3030.208	460.8	-141.2	91.2
42.0	591.405	-5580.171	3030.301	464.7	-147.4	93.6
43.0	591.872	-5580.322	3030.396	468.9	-153.6	95.9
44.0	592.343	-5580.479	3030.493	473.3	-160.0	98.2
45.0	592.818	-5580.642	3030.592	477.9	-166.4	100.6
46.0	593.298	-5580.811	3030.694	482.7	-172.7	103.0
47.0	593.783	-5580.987	3030.798	487.7	-179.1	105.4
48.0	594.274	-5581.170	3030.905	492.8	-185.7	108.0
49.0	594.769	-5581.359	3031.014	498.2	-192.3	110.3
50.0	595.269	-5581.554	3031.125	503.6	-199.0	112.8
51.0	595.776	-5581.757	3031.239	509.3	-205.7	115.2
52.0	596.288	-5581.966	3031.356	515.1	-212.4	117.7
53.0	596.806	-5582.181	3031.475	520.9	-219.0	120.3
54.0	597.329	-5582.404	3031.596	526.9	-225.4	122.9
MACH ONE						
54.006	597.332	-5582.405	3031.597	527.0	-225.5	122.9
55.0	597.859	-5582.632	3031.720	532.9	-231.7	125.3
56.0	598.395	-5582.867	3031.847	539.0	-238.0	127.4
57.0	598.937	-5583.108	3031.975	545.5	-244.1	129.3
58.0	599.486	-5583.355	3032.105	552.2	-250.5	131.2
59.0	600.041	-5583.609	3032.237	559.4	-256.8	133.1
60.0	600.604	-5583.869	3032.371	566.5	-263.2	134.9
61.0	601.174	-5584.135	3032.507	574.1	-269.6	136.9
62.0	601.752	-5584.408	3032.645	582.0	-276.2	139.0
63.0	602.338	-5584.688	3032.785	590.3	-282.9	141.1
64.0	602.933	-5584.974	3032.927	598.9	-289.7	143.2
65.0	603.536	-5585.267	3033.072	607.8	-296.7	145.3

TABLE X
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S
66.0	604.148	-5585.568	3033.218	616.9	-303.9	147.4
MAXIMUM DYNAMIC PRESSURE						
67.000	604.769	-5585.876	3033.366	626.2	-311.3	149.4
68.0	605.400	-5586.191	3033.517	635.8	-318.9	151.4
69.0	606.041	-5586.513	3033.669	645.7	-326.7	153.3
70.0	606.691	-5586.844	3033.824	655.8	-334.7	155.2
71.0	607.352	-5587.183	3033.980	666.3	-342.9	157.0
72.0	608.024	-5587.530	3034.138	677.2	-351.2	158.9
73.0	608.706	-5587.886	3034.298	688.4	-359.6	160.9
74.0	609.400	-5588.250	3034.460	700.0	-368.2	162.9
75.0	610.106	-5588.622	3034.624	711.9	-377.0	164.8
76.0	610.824	-5589.004	3034.789	724.2	-385.9	166.7
77.0	611.555	-5589.394	3034.957	736.7	-395.1	168.7
78.0	612.297	-5589.794	3035.127	749.6	-404.4	170.8
79.0	613.053	-5590.203	3035.299	762.8	-413.8	173.0
80.0	613.823	-5590.622	3035.473	776.4	-423.3	175.3
81.0	614.606	-5591.050	3035.650	790.3	-433.1	177.6
82.0	615.403	-5591.488	3035.829	804.6	-443.0	179.9
83.0	616.215	-5591.937	3036.010	819.2	-453.1	182.2
84.0	617.042	-5592.395	3036.193	834.3	-463.4	184.4
85.0	617.884	-5592.864	3036.379	849.7	-473.9	186.6
86.0	618.741	-5593.343	3036.566	865.5	-484.5	188.8
87.0	619.615	-5593.833	3036.756	881.8	-495.4	191.0
88.0	620.504	-5594.334	3036.949	898.4	-506.3	193.2
89.0	621.411	-5594.846	3037.143	915.4	-517.4	195.5
90.0	622.335	-5595.369	3037.340	932.8	-528.6	197.7
91.0	623.277	-5595.904	3037.538	950.6	-540.0	199.9
92.0	624.236	-5596.449	3037.740	968.8	-551.5	202.1
93.0	625.214	-5597.007	3037.943	987.4	-563.2	204.3
94.0	626.211	-5597.576	3038.148	1006.4	-575.1	206.4
95.0	627.227	-5598.157	3038.356	1025.9	-587.0	208.5
96.0	628.263	-5598.750	3038.565	1045.7	-599.1	210.5
97.0	629.319	-5599.356	3038.777	1066.0	-611.4	212.5
98.0	630.395	-5599.973	3038.991	1086.7	-623.8	214.5
99.0	631.492	-5600.603	3039.206	1107.8	-636.4	216.5
100.0	632.609	-5601.245	3039.424	1129.3	-649.2	218.4
101.0	633.749	-5601.900	3039.643	1151.2	-662.0	220.4

TABLE X
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S
102.0	634.911	-5602.568	3039.865	1173.6	-675.1	222.4
103.0	636.096	-5603.250	3040.088	1196.4	-688.2	224.3
104.0	637.304	-5603.945	3040.314	1219.6	-701.5	226.2
105.0	638.535	-5604.653	3040.541	1243.2	-715.0	228.1
106.0	639.791	-5605.375	3040.770	1267.3	-728.7	229.9
107.0	641.070	-5606.111	3041.001	1291.9	-742.5	231.8
108.0	642.375	-5606.861	3041.234	1316.9	-756.5	233.6
109.0	643.704	-5607.624	3041.468	1342.3	-770.7	235.3
110.0	645.059	-5608.402	3041.704	1368.2	-785.0	237.1
111.0	646.441	-5609.195	3041.942	1394.6	-799.6	238.9
112.0	647.848	-5610.002	3042.182	1421.5	-814.3	240.7
113.0	649.284	-5610.824	3042.424	1448.9	-829.3	242.4
114.0	650.746	-5611.660	3042.667	1476.8	-844.4	244.1
115.0	652.237	-5612.513	3042.912	1505.1	-859.8	245.8
116.0	653.757	-5613.380	3043.159	1534.1	-875.3	247.5
117.0	655.306	-5614.264	3043.407	1563.5	-891.1	249.1
118.0	656.884	-5615.163	3043.657	1593.5	-907.0	250.8
119.0	658.493	-5616.078	3043.909	1624.1	-923.3	252.4
120.0	660.133	-5617.010	3044.162	1655.2	-939.7	254.0
121.0	661.804	-5617.958	3044.417	1686.9	-956.4	255.6
122.0	663.507	-5618.923	3044.674	1719.2	-973.3	257.2
123.0	665.243	-5619.905	3044.932	1752.1	-990.5	258.8
124.0	667.011	-5620.904	3045.191	1785.6	-1008.0	260.4
125.0	668.814	-5621.921	3045.453	1819.7	-1025.7	262.0
126.0	670.651	-5622.956	3045.716	1854.5	-1043.7	263.6
127.0	672.523	-5624.009	3045.980	1890.0	-1062.0	265.2
128.0	674.432	-5625.080	3046.246	1926.2	-1080.6	266.8
129.0	676.376	-5626.170	3046.514	1963.1	-1099.6	268.4
130.0	678.358	-5627.280	3046.783	2000.7	-1118.8	270.0
131.0	680.378	-5628.408	3047.054	2039.0	-1138.3	271.7
132.0	682.436	-5629.557	3047.326	2078.2	-1158.2	273.3
133.0	684.535	-5630.725	3047.601	2118.1	-1178.5	275.0
134.0	686.673	-5631.914	3047.877	2158.8	-1199.2	276.7
135.0	688.853	-5633.124	3048.154	2200.4	-1220.2	278.3
136.0	691.075	-5634.355	3048.433	2243.0	-1241.6	280.0
137.0	693.339	-5635.608	3048.714	2286.4	-1263.5	281.7
138.0	695.648	-5636.882	3048.997	2330.6	-1285.8	283.5
139.0	698.001	-5638.180	3049.281	2375.7	-1308.5	285.2
140.0	700.400	-5639.500	3049.567	2421.8	-1331.9	287.2
141.0	702.845	-5640.844	3049.856	2468.9	-1355.9	289.2

TABLE X
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S
INBOARD ENGINE CUTOFF						
142.000	705.338	-5642.212	3050.146	2516.8	-1380.5	291.2
143.0	707.873	-5643.601	3050.437	2548.2	-1393.9	291.1
144.0	710.434	-5645.000	3050.728	2573.0	-1403.0	290.2
145.0	713.020	-5646.408	3051.018	2597.2	-1411.7	289.1
146.0	715.629	-5647.824	3051.306	2621.5	-1420.4	288.0
147.0	718.263	-5649.249	3051.594	2646.1	-1429.2	287.0
148.0	720.922	-5650.683	3051.881	2670.6	-1438.1	285.9
OUTBOARD ENGINE CUTOFF						
148.050	721.055	-5650.754	3051.895	2671.8	-1438.5	285.9
149.0	723.598	-5652.120	3052.165	2676.4	-1434.3	282.3
150.0	726.274	-5653.551	3052.445	2676.3	-1426.6	277.9
155.0	739.670	-5660.599	3053.783	2687.6	-1396.0	257.7
160.0	753.165	-5667.523	3055.027	2709.8	-1373.0	239.2
165.0	766.774	-5674.334	3056.179	2732.3	-1350.6	220.9
GUIDANCE INITIATION						
166.690	771.398	-5676.610	3056.547	2740.0	-1343.1	214.8
170.0	780.493	-5681.032	3057.238	2755.1	-1328.6	202.8
175.0	794.322	-5687.623	3058.208	2776.7	-1308.5	185.5
180.0	808.258	-5694.117	3059.094	2797.7	-1289.2	169.0
185.0	822.300	-5700.515	3059.897	2819.4	-1269.8	152.1
190.0	836.453	-5706.815	3060.615	2841.5	-1250.1	135.1
195.0	850.717	-5713.016	3061.248	2864.2	-1230.3	117.8
200.0	865.096	-5719.118	3061.793	2887.4	-1210.4	100.5
205.0	879.591	-5725.120	3062.252	2910.8	-1190.4	83.0
210.0	894.205	-5731.022	3062.624	2934.7	-1170.5	65.5
215.0	908.939	-5736.824	3062.907	2958.9	-1150.5	47.9
220.0	923.795	-5742.527	3063.101	2983.7	-1130.4	30.1
225.0	938.775	-5748.128	3063.207	3008.8	-1110.2	12.2
230.0	953.883	-5753.629	3063.223	3034.4	-1089.9	-5.8
235.0	969.120	-5759.027	3063.149	3060.4	-1069.5	-24.1

TABLE X
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S
240.0	984.488	-5764.324	3062.982	3086.8	-1049.0	-42.4
245.0	999.988	-5769.517	3062.724	3113.6	-1028.3	-61.0
250.0	1015.624	-5774.607	3062.372	3140.8	-1007.5	-79.8
255.0	1031.397	-5779.593	3061.926	3168.3	-986.6	-98.7
260.0	1047.309	-5784.473	3061.385	3196.3	-965.6	-117.8
265.0	1063.361	-5789.248	3060.748	3224.8	-944.4	-137.2
270.0	1079.557	-5793.916	3060.013	3253.6	-923.0	-156.6
275.0	1095.898	-5798.477	3059.181	3282.9	-901.3	-176.4
280.0	1112.387	-5802.929	3058.249	3312.7	-879.5	-196.3
285.0	1129.026	-5807.273	3057.217	3342.9	-857.7	-216.5
290.0	1145.816	-5811.506	3056.084	3373.5	-835.6	-236.8
295.0	1162.762	-5815.628	3054.849	3404.6	-813.2	-257.5
300.0	1179.864	-5819.638	3053.509	3436.3	-790.7	-278.4
305.0	1197.125	-5823.535	3052.064	3468.4	-767.9	-299.6
310.0	1214.549	-5827.317	3050.513	3501.1	-744.8	-320.9
315.0	1232.137	-5830.983	3048.854	3534.3	-721.5	-342.7
320.0	1249.892	-5834.532	3047.086	3568.0	-698.1	-364.6
325.0	1267.817	-5837.963	3045.208	3602.1	-674.3	-386.9
330.0	1285.914	-5841.275	3043.217	3636.8	-650.3	-409.4
335.0	1304.187	-5844.465	3041.113	3672.2	-625.7	-432.3
340.0	1322.637	-5847.532	3038.894	3707.9	-601.1	-455.5
345.0	1341.267	-5850.476	3036.557	3744.2	-576.3	-478.9
350.0	1360.079	-5853.294	3034.103	3781.0	-551.1	-502.8
355.0	1379.078	-5855.986	3031.529	3818.3	-525.5	-526.9
360.0	1398.264	-5858.549	3028.834	3856.3	-499.5	-551.4
365.0	1417.641	-5860.980	3026.014	3894.6	-473.1	-576.3
370.0	1437.212	-5863.279	3023.070	3933.7	-446.3	-601.5
375.0	1456.979	-5865.442	3019.999	3973.2	-419.1	-627.1
380.0	1476.945	-5867.469	3016.798	4013.3	-391.5	-653.1
385.0	1497.113	-5869.356	3013.467	4054.0	-363.3	-679.5
390.0	1517.485	-5871.102	3010.003	4095.3	-334.8	-706.3
395.0	1538.066	-5872.703	3006.403	4137.1	-305.6	-733.7
400.0	1558.858	-5874.157	3002.666	4179.6	-276.0	-761.4
405.0	1579.863	-5875.462	2998.789	4222.6	-246.0	-789.5
410.0	1601.085	-5876.616	2994.770	4266.2	-215.3	-818.1
415.0	1622.527	-5877.615	2990.607	4310.5	-184.2	-847.2
420.0	1644.191	-5878.456	2986.297	4355.4	-152.4	-876.7
425.0	1666.082	-5879.138	2981.839	4400.9	-120.0	-906.9
430.0	1688.201	-5879.655	2977.228	4447.1	-87.0	-937.3
435.0	1710.553	-5880.007	2972.464	4493.8	-53.4	-968.4

TABLE X
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S
440.0	1733.141	-5880.189	2967.543	4541.3	-19.2	-1000.1
445.0	1755.967	-5880.197	2962.463	4589.4	15.9	-1032.3
450.0	1779.036	-5880.029	2957.219	4638.1	51.5	-1065.1
455.0	1802.350	-5879.681	2951.811	4687.6	88.0	-1098.5
460.0	1825.912	-5879.148	2946.234	4737.7	125.2	-1132.5
465.0	1849.728	-5878.428	2940.485	4788.4	163.1	-1167.1
470.0	1873.798	-5877.515	2934.562	4839.8	202.0	-1202.3
475.0	1898.128	-5876.407	2928.461	4892.0	241.6	-1238.3
480.0	1922.719	-5875.098	2922.178	4944.8	282.1	-1274.9
485.0	1947.577	-5873.584	2915.711	4998.5	323.5	-1312.2
490.0	1972.705	-5871.862	2909.055	5052.8	365.8	-1350.2
495.0	1998.107	-5869.925	2902.208	5108.0	409.1	-1389.0
500.0	2023.786	-5867.769	2895.164	5163.9	453.5	-1428.6
505.0	2049.747	-5865.389	2887.920	5220.7	498.8	-1469.0
510.0	2075.994	-5862.779	2880.473	5278.3	545.3	-1510.1
515.0	2102.531	-5859.934	2872.817	5336.6	592.9	-1552.3
520.0	2129.362	-5856.848	2864.949	5395.9	641.7	-1595.2
525.0	2156.491	-5853.515	2856.863	5455.9	691.5	-1639.1
530.0	2183.923	-5849.930	2848.557	5516.9	742.7	-1683.8
535.0	2211.662	-5846.086	2840.024	5578.8	795.2	-1729.6
540.0	2239.713	-5841.976	2831.259	5641.5	849.0	-1776.3
545.0	2268.079	-5837.594	2822.258	5705.3	904.3	-1824.2
550.0	2296.767	-5832.931	2813.016	5770.0	961.0	-1873.1
555.0	2325.781	-5827.980	2803.526	5835.7	1019.3	-1923.2
560.0	2355.126	-5822.735	2793.782	5902.5	1079.2	-1974.5
565.0	2384.807	-5817.186	2783.779	5970.3	1140.8	-2026.9
570.0	2414.831	-5811.324	2773.511	6039.2	1204.3	-2080.6
575.0	2445.201	-5805.140	2762.970	6109.2	1269.5	-2135.8
580.0	2475.925	-5798.626	2752.151	6180.4	1336.7	-2192.3
585.0	2507.007	-5791.769	2741.044	6252.5	1406.2	-2250.5
590.0	2538.453	-5784.560	2729.644	6325.8	1477.8	-2310.0
595.0	2570.267	-5776.988	2717.941	6400.2	1551.7	-2371.3
600.0	2602.458	-5769.039	2705.928	6476.0	1627.9	-2434.2
605.0	2635.029	-5760.703	2693.597	6552.9	1706.8	-2498.8
610.0	2667.990	-5751.967	2680.937	6631.5	1787.9	-2565.4
615.0	2701.346	-5742.819	2667.940	6711.6	1871.8	-2633.7
620.0	2735.105	-5733.244	2654.596	6792.6	1959.1	-2704.3

S-IV GUIDANCE CUTOFF

624.151	2763.441	-5724.956	2643.245	6860.7	2034.7	-2764.8
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TABLE X
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S
625.0	2769.266	-5723.225	2640.896	6860.0	2041.9	-2768.8
630.0	2803.522	-5712.927	2627.012	6843.1	2076.8	-2785.0
INSERTIØN						
634.151	2831.897	-5704.246	2615.424	6828.8	2105.8	-2798.3

TABLE XI
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
FIRST MOTION						
-0.180	0.22	3.03	0.11	0.43	-2.72	1.30
LIFTOFF SIGNAL						
0.078	0.17	3.11	0.09	0.39	-2.78	1.37
1.0	0.03	3.35	0.03	0.30	-2.95	1.56
2.0	-0.05	3.52	-0.00	0.24	-3.08	1.70
3.0	-0.10	3.65	-0.02	0.21	-3.18	1.78
4.0	-0.11	3.74	-0.02	0.21	-3.26	1.83
5.0	-0.11	3.81	-0.02	0.21	-3.32	1.86
6.0	-0.10	3.87	-0.02	0.23	-3.38	1.89
7.0	-0.09	3.94	-0.01	0.24	-3.44	1.91
8.0	-0.08	4.00	-0.01	0.27	-3.50	1.94
9.0	-0.06	4.08	-0.02	0.29	-3.56	1.98
10.0	-0.04	4.16	-0.02	0.31	-3.63	2.01
11.0	-0.03	4.24	-0.03	0.34	-3.70	2.06
12.0	-0.00	4.33	-0.04	0.37	-3.77	2.10
13.0	0.02	4.42	-0.05	0.41	-3.85	2.15
14.0	0.06	4.51	-0.05	0.45	-3.93	2.19
15.0	0.10	4.60	-0.06	0.51	-4.00	2.23
16.0	0.15	4.69	-0.06	0.56	-4.08	2.26
17.0	0.21	4.78	-0.06	0.63	-4.16	2.29
18.0	0.28	4.86	-0.06	0.71	-4.23	2.31
19.0	0.35	4.94	-0.05	0.79	-4.31	2.32
20.0	0.44	5.02	-0.04	0.87	-4.38	2.33
21.0	0.53	5.10	-0.03	0.97	-4.46	2.34
22.0	0.62	5.18	-0.02	1.06	-4.54	2.35
23.0	0.71	5.27	-0.01	1.16	-4.62	2.36
24.0	0.80	5.36	0.01	1.25	-4.71	2.37
25.0	0.89	5.46	0.02	1.35	-4.80	2.39
26.0	0.99	5.56	0.03	1.45	-4.90	2.41
27.0	1.08	5.67	0.03	1.55	-5.00	2.43
28.0	1.19	5.78	0.04	1.66	-5.10	2.46
29.0	1.30	5.89	0.05	1.79	-5.20	2.47
30.0	1.52	5.94	0.08	2.00	-5.26	2.42

TABLE XI
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
31.0	1.68	6.03	0.10	2.16	-5.35	2.41
32.0	1.82	6.11	0.12	2.30	-5.44	2.40
33.0	1.97	6.19	0.15	2.45	-5.53	2.38
34.0	2.13	6.28	0.17	2.61	-5.61	2.37
35.0	2.31	6.37	0.17	2.79	-5.70	2.37
36.0	2.46	6.46	0.15	2.95	-5.77	2.40
37.0	2.59	6.55	0.11	3.10	-5.84	2.44
38.0	2.70	6.64	0.08	3.22	-5.90	2.49
39.0	2.83	6.74	0.07	3.36	-5.98	2.52
40.0	3.01	6.84	0.09	3.54	-6.08	2.51
41.0	3.25	6.92	0.14	3.77	-6.18	2.44
42.0	3.52	6.98	0.20	4.03	-6.27	2.36
43.0	3.78	7.03	0.24	4.28	-6.34	2.30
44.0	4.00	7.09	0.22	4.51	-6.38	2.29
45.0	4.17	7.17	0.16	4.69	-6.42	2.34
46.0	4.30	7.20	0.09	4.84	-6.42	2.38
47.0	4.46	7.28	0.03	5.02	-6.46	2.43
48.0	4.64	7.38	-0.01	5.21	-6.54	2.48
49.0	4.82	7.50	-0.05	5.41	-6.62	2.53
50.0	4.98	7.59	-0.08	5.58	-6.69	2.56
51.0	5.12	7.64	-0.10	5.72	-6.72	2.57
52.0	5.20	7.62	-0.11	5.81	-6.70	2.55
53.0	5.28	7.51	-0.12	5.87	-6.60	2.49
54.0	5.36	7.35	-0.12	5.94	-6.46	2.40
MACH ONE						
54.006	5.36	7.35	-0.12	5.94	-6.46	2.40
55.0	5.47	7.21	-0.12	6.03	-6.34	2.30
56.0	5.59	7.11	-0.11	6.14	-6.26	2.22
57.0	5.86	7.06	-0.09	6.40	-6.23	2.12
58.0	6.18	7.07	-0.08	6.71	-6.25	2.04
59.0	6.50	7.16	-0.06	7.03	-6.34	1.99
60.0	6.83	7.34	-0.03	7.36	-6.52	1.98
61.0	7.14	7.47	-0.14	7.70	-6.58	2.06
62.0	7.51	7.59	-0.21	8.08	-6.66	2.10
63.0	7.86	7.72	-0.24	8.45	-6.76	2.11
64.0	8.15	7.89	-0.22	8.74	-6.92	2.11
65.0	8.36	8.08	-0.17	8.96	-7.12	2.10

TABLE XI
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
66.0	8.58	8.28	-0.09	9.17	-7.33	2.08
MAXIMUM DYNAMIC PRESSURE						
67.000	8.83	8.47	0.03	9.41	-7.56	2.01
68.0	9.12	8.64	0.14	9.69	-7.76	1.93
69.0	9.43	8.80	0.23	9.99	-7.95	1.87
70.0	9.75	8.97	0.26	10.31	-8.12	1.84
71.0	10.07	9.14	0.23	10.65	-8.26	1.88
72.0	10.42	9.31	0.16	11.02	-8.38	1.94
73.0	10.78	9.49	0.13	11.39	-8.52	1.97
74.0	11.12	9.68	0.16	11.74	-8.71	1.96
75.0	11.43	9.88	0.22	12.05	-8.92	1.93
76.0	11.72	10.09	0.25	12.35	-9.11	1.94
77.0	12.01	10.30	0.19	12.66	-9.27	2.03
78.0	12.32	10.50	0.06	13.01	-9.39	2.16
79.0	12.65	10.70	-0.04	13.38	-9.52	2.27
80.0	12.98	10.90	-0.06	13.73	-9.69	2.31
81.0	13.34	11.09	-0.03	14.09	-9.87	2.29
82.0	13.70	11.28	0.01	14.45	-10.05	2.26
83.0	14.07	11.47	0.05	14.82	-10.24	2.24
84.0	14.45	11.66	0.07	15.21	-10.42	2.23
85.0	14.83	11.85	0.09	15.60	-10.61	2.21
86.0	15.22	12.03	0.10	15.99	-10.77	2.20
87.0	15.61	12.20	0.08	16.39	-10.91	2.21
88.0	15.99	12.37	0.05	16.79	-11.05	2.23
89.0	16.37	12.53	0.04	17.18	-11.19	2.23
90.0	16.75	12.71	0.04	17.57	-11.35	2.22
91.0	17.14	12.88	0.05	17.96	-11.50	2.22
92.0	17.54	13.04	0.05	18.37	-11.65	2.20
93.0	17.95	13.19	0.06	18.79	-11.79	2.16
94.0	18.38	13.34	0.09	19.22	-11.93	2.11
95.0	18.81	13.48	0.14	19.64	-12.08	2.04
96.0	19.23	13.63	0.18	20.06	-12.23	1.98
97.0	19.64	13.78	0.19	20.47	-12.38	1.95
98.0	20.02	13.95	0.18	20.87	-12.53	1.96
99.0	20.41	14.13	0.15	21.27	-12.67	1.98
100.0	20.81	14.29	0.14	21.68	-12.81	1.98
101.0	21.22	14.46	0.14	22.10	-12.95	1.96

TABLE XI
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
102.0	21.65	14.63	0.15	22.53	-13.11	1.94
103.0	22.08	14.81	0.15	22.97	-13.27	1.92
104.0	22.52	14.99	0.16	23.42	-13.43	1.90
105.0	22.95	15.17	0.18	23.85	-13.60	1.87
106.0	23.38	15.35	0.22	24.29	-13.78	1.83
107.0	23.82	15.54	0.25	24.73	-13.96	1.80
108.0	24.27	15.74	0.25	25.19	-14.14	1.78
109.0	24.72	15.94	0.24	25.66	-14.31	1.79
110.0	25.19	16.15	0.22	26.14	-14.49	1.80
111.0	25.66	16.36	0.23	26.62	-14.68	1.79
112.0	26.13	16.57	0.26	27.10	-14.88	1.76
113.0	26.63	16.78	0.29	27.59	-15.08	1.72
114.0	27.13	16.99	0.31	28.11	-15.28	1.68
115.0	27.65	17.21	0.32	28.63	-15.47	1.66
116.0	28.18	17.45	0.32	29.17	-15.68	1.65
117.0	28.70	17.70	0.33	29.71	-15.91	1.65
118.0	29.23	17.95	0.34	30.25	-16.14	1.64
119.0	29.77	18.21	0.36	30.80	-16.37	1.62
120.0	29.77	18.46	0.37	31.37	-16.60	1.61
121.0	30.33	18.73	0.38	31.96	-16.84	1.60
122.0	30.91	19.02	0.39	32.56	-17.09	1.59
123.0	31.49	19.31	0.39	33.17	-17.36	1.60
124.0	32.09	19.62	0.39	33.80	-17.63	1.60
125.0	32.70	19.94	0.40	34.44	-17.91	1.60
126.0	33.32	20.26	0.41	35.11	-18.20	1.60
127.0	33.98	20.60	0.42	35.80	-18.50	1.61
128.0	34.65	20.93	0.42	36.50	-18.80	1.61
129.0	35.33	21.27	0.42	37.22	-19.10	1.61
130.0	36.03	21.64	0.42	37.95	-19.42	1.63
131.0	36.74	22.02	0.42	38.71	-19.76	1.64
132.0	37.48	22.43	0.43	39.49	-20.13	1.65
133.0	38.24	22.85	0.44	40.30	-20.50	1.66
134.0	39.02	23.28	0.45	41.13	-20.88	1.68
135.0	39.83	23.72	0.46	41.99	-21.27	1.69
136.0	40.66	24.15	0.47	42.90	-21.66	1.69
137.0	41.55	24.63	0.48	43.81	-22.08	1.71
138.0	42.43	25.15	0.49	44.71	-22.55	1.75
139.0	43.30	25.72	0.50	45.62	-23.05	1.82
140.0	44.17	26.33	0.51	46.53	-23.59	1.91
141.0	45.04	26.99	0.52	47.43	-24.17	2.02

TABLE XI
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
INBOARD ENGINE CUTOFF						
142.000	46.75	27.69	0.52	48.34	-24.79	2.15
143.0	24.75	10.41	0.38	25.24	-9.32	-0.97
144.0	24.31	10.09	0.37	24.78	-9.03	-1.02
145.0	24.06	9.91	0.37	24.52	-8.85	-1.06
146.0	24.00	9.84	0.37	24.45	-8.79	-1.07
147.0	24.13	9.91	0.37	24.59	-8.85	-1.07
148.0	24.45	10.11	0.38	24.92	-9.02	-1.05
OUTBOARD ENGINE CUTOFF						
148.050	24.47	10.12	0.38	24.94	-9.03	-1.05
149.0	1.59	-7.86	0.21	0.91	7.06	-4.29
150.0	0.51	-8.66	0.20	-0.22	7.78	-4.42
155.0	4.95	-5.10	0.22	4.45	4.61	-3.75
160.0	4.92	-4.97	0.21	4.43	4.50	-3.67
165.0	5.02	-4.87	0.21	4.53	4.41	-3.65
GUIDANCE INITIATION						
166.690	5.04	-4.83	0.20	4.56	4.38	-3.62
170.0	4.94	-4.71	0.30	4.45	4.24	-3.62
175.0	4.62	-4.24	0.29	4.18	3.84	-3.33
180.0	4.68	-4.17	0.31	4.24	3.78	-3.32
185.0	4.83	-4.31	0.29	4.37	3.91	-3.41
190.0	4.93	-4.31	0.29	4.46	3.91	-3.43
195.0	5.03	-4.35	0.30	4.55	3.95	-3.47
200.0	5.13	-4.31	0.31	4.64	3.91	-3.48
205.0	5.19	-4.36	0.28	4.70	3.97	-3.50
210.0	5.28	-4.39	0.28	4.78	4.00	-3.54
215.0	5.35	-4.34	0.31	4.84	3.95	-3.56
220.0	5.48	-4.33	0.28	4.97	3.96	-3.56
225.0	5.58	-4.41	0.28	5.06	4.03	-3.61
230.0	5.66	-4.42	0.28	5.13	4.05	-3.63
235.0	5.77	-4.42	0.29	5.23	4.05	-3.67

TABLE XI
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
240.0	5.83	-4.42	0.29	5.28	4.05	-3.68
245.0	5.92	-4.52	0.29	5.36	4.15	-3.75
250.0	6.00	-4.50	0.30	5.44	4.12	-3.77
255.0	6.10	-4.56	0.30	5.52	4.19	-3.82
260.0	6.19	-4.59	0.30	5.60	4.21	-3.85
265.0	6.29	-4.58	0.31	5.69	4.21	-3.88
270.0	6.42	-4.65	0.32	5.81	4.27	-3.95
275.0	6.53	-4.65	0.32	5.90	4.28	-3.98
280.0	6.62	-4.67	0.31	5.99	4.30	-4.00
285.0	6.70	-4.71	0.32	6.06	4.34	-4.04
290.0	6.77	-4.77	0.32	6.12	4.40	-4.09
295.0	6.92	-4.87	0.33	6.25	4.49	-4.18
300.0	7.02	-4.91	0.34	6.33	4.52	-4.23
305.0	7.14	-4.93	0.35	6.44	4.54	-4.27
310.0	7.26	-4.99	0.35	6.54	4.60	-4.33
315.0	7.37	-4.97	0.34	6.65	4.60	-4.34
320.0	7.51	-5.04	0.35	6.77	4.66	-4.41
325.0	7.64	-5.07	0.35	6.89	4.69	-4.46
330.0	7.75	-5.21	0.33	6.99	4.83	-4.53
335.0	7.89	-5.31	0.36	7.09	4.92	-4.64
340.0	8.01	-5.33	0.36	7.21	4.93	-4.68
345.0	8.12	-5.30	0.37	7.31	4.92	-4.69
350.0	8.24	-5.43	0.38	7.41	5.03	-4.79
355.0	8.33	-5.48	0.39	7.48	5.08	-4.84
360.0	8.46	-5.63	0.39	7.58	5.22	-4.94
365.0	8.58	-5.72	0.39	7.68	5.31	-5.01
370.0	8.73	-5.79	0.39	7.82	5.37	-5.08
375.0	8.86	-5.88	0.40	7.92	5.46	-5.16
380.0	9.00	-5.96	0.40	8.04	5.54	-5.24
385.0	9.14	-6.08	0.41	8.17	5.64	-5.33
390.0	9.31	-6.17	0.40	8.31	5.74	-5.40
395.0	9.48	-6.30	0.41	8.46	5.86	-5.51
400.0	9.60	-6.37	0.43	8.55	5.91	-5.59
405.0	9.72	-6.50	0.44	8.65	6.04	-5.69
410.0	9.87	-6.64	0.43	8.78	6.17	-5.78
415.0	10.00	-6.75	0.44	8.88	6.27	-5.87
420.0	10.15	-6.87	0.45	9.00	6.38	-5.97
425.0	10.30	-6.97	0.47	9.12	6.47	-6.07
430.0	10.46	-7.14	0.46	9.26	6.63	-6.18
435.0	10.66	-7.26	0.47	9.43	6.74	-6.29

TABLE XI
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE		DDYE		DDZE		DDXSP		DDYSP		DDZSP	
	M/S	SQ	M/S	SQ	M/S	SQ	M/S	SQ	M/S	SQ	M/S	SQ
440.0	10.80		-7.40		0.47		9.54		6.87		-6.39	
445.0	10.94		-7.56		0.47		9.65		7.03		-6.50	
450.0	11.12		-7.72		0.44		9.80		7.19		-6.59	
455.0	11.29		-7.89		0.49		9.94		7.33		-6.75	
460.0	11.44		-8.04		0.49		10.06		7.47		-6.86	
465.0	11.62		-8.20		0.50		10.20		7.62		-6.98	
470.0	11.78		-8.43		0.51		10.33		7.82		-7.14	
475.0	11.97		-8.61		0.51		10.48		7.99		-7.27	
480.0	12.11		-8.81		0.51		10.58		8.19		-7.39	
485.0	12.32		-8.91		0.53		10.76		8.28		-7.50	
490.0	12.54		-9.20		0.53		10.93		8.54		-7.70	
495.0	12.75		-9.40		0.54		11.10		8.72		-7.84	
500.0	12.95		-9.62		0.54		11.26		8.93		-8.00	
505.0	13.16		-9.87		0.52		11.43		9.17		-8.14	
510.0	13.33		-10.11		0.55		11.55		9.38		-8.33	
515.0	13.56		-10.35		0.56		11.74		9.60		-8.50	
520.0	13.78		-10.58		0.57		11.91		9.81		-8.67	
525.0	14.03		-10.88		0.58		12.10		10.08		-8.87	
530.0	14.25		-11.13		0.59		12.27		10.31		-9.05	
535.0	14.46		-11.47		0.59		12.42		10.63		-9.26	
540.0	14.73		-11.70		0.60		12.64		10.84		-9.45	
545.0	14.98		-12.03		0.60		12.83		11.14		-9.66	
550.0	15.24		-12.40		0.62		13.03		11.47		-9.92	
555.0	15.50		-12.77		0.63		13.22		11.81		-10.16	
560.0	15.78		-13.09		0.67		13.43		12.08		-10.41	
565.0	16.07		-13.45		0.63		13.67		12.43		-10.61	
570.0	16.35		-13.85		0.65		13.87		12.79		-10.88	
575.0	16.71		-14.21		0.65		14.16		13.13		-11.14	
580.0	16.93		-14.79		0.65		14.29		13.65		-11.47	
585.0	17.27		-15.25		0.66		14.55		14.07		-11.77	
590.0	17.57		-15.77		0.68		14.75		14.53		-12.10	
595.0	17.86		-16.29		0.68		14.95		15.00		-12.41	
600.0	18.25		-16.79		0.70		15.24		15.46		-12.76	
605.0	18.59		-17.40		0.70		15.48		16.01		-13.13	
610.0	19.06		-17.84		0.70		15.87		16.42		-13.44	
615.0	19.42		-18.54		0.67		16.12		17.06		-13.84	
620.0	19.83		-19.35		0.68		16.39		17.79		-14.33	

S-IV GUIDANCE CUTOFF

624.151	20.17		-20.03		0.68		16.62		18.40		-14.73	
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TABLE XI
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE		DDYE		DDZE		DDXSP		DDYSP		DDZSP	
	M/S	SQ	M/S	SQ	M/S	SQ	M/S	SQ	M/S	SQ	M/S	SQ
625.0	-2.16		-7.18		0.35		-3.40		6.95		-3.24	
630.0	-2.20		-7.17		0.35		-3.44		6.93		-3.22	
INSERTIØN												
634.151	-2.23		-7.16		0.34		-3.48		6.92		-3.21	

TABLE XII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S
FIRST MØTIØN							
-0.180	6373.350	-80.56495	28.37067	28.53185	0.	90.000	0.
LIFTØFF SIGNAL							
0.078	6373.350	-80.56495	28.37067	28.53185	131.319	86.103	0.8
1.0	6373.352	-80.56495	28.37067	28.53185	132.613	87.719	3.8
2.0	6373.358	-80.56495	28.37067	28.53185	136.790	88.907	7.2
3.0	6373.367	-80.56495	28.37067	28.53185	158.316	89.666	10.8
4.0	6373.379	-80.56495	28.37067	28.53185	269.834	89.710	14.5
5.0	6373.396	-80.56495	28.37067	28.53185	288.947	89.413	18.3
6.0	6373.416	-80.56495	28.37067	28.53185	293.038	89.221	22.1
7.0	6373.440	-80.56496	28.37067	28.53185	294.710	89.111	26.0
8.0	6373.468	-80.56496	28.37067	28.53185	295.842	89.058	30.0
9.0	6373.500	-80.56497	28.37068	28.53185	297.057	89.043	34.0
10.0	6373.536	-80.56497	28.37068	28.53186	298.677	89.054	38.2
11.0	6373.576	-80.56498	28.37068	28.53186	300.924	89.084	42.4
12.0	6373.620	-80.56499	28.37068	28.53186	304.005	89.130	46.6
13.0	6373.669	-80.56499	28.37069	28.53186	308.185	89.188	51.0
14.0	6373.722	-80.56500	28.37069	28.53187	313.888	89.259	55.5
15.0	6373.780	-80.56500	28.37070	28.53187	321.865	89.339	60.0
16.0	6373.842	-80.56501	28.37070	28.53188	333.423	89.421	64.7
17.0	6373.909	-80.56501	28.37071	28.53189	350.400	89.488	69.4
18.0	6373.981	-80.56501	28.37071	28.53189	13.327	89.507	74.2
19.0	6374.058	-80.56501	28.37072	28.53190	37.557	89.446	79.1
20.0	6374.140	-80.56500	28.37073	28.53190	56.757	89.299	84.1
21.0	6374.226	-80.56499	28.37073	28.53191	69.852	89.087	89.2
22.0	6374.318	-80.56498	28.37073	28.53191	78.622	88.828	94.3
23.0	6374.415	-80.56495	28.37074	28.53191	84.682	88.535	99.6
24.0	6374.517	-80.56493	28.37074	28.53192	89.030	88.217	104.9
25.0	6374.624	-80.56489	28.37074	28.53192	92.252	87.880	110.3
26.0	6374.737	-80.56484	28.37074	28.53191	94.701	87.529	115.9
27.0	6374.856	-80.56479	28.37073	28.53191	96.602	87.165	121.5
28.0	6374.980	-80.56472	28.37072	28.53190	98.109	86.791	127.3
29.0	6375.110	-80.56465	28.37071	28.53189	99.325	86.407	133.2
30.0	6375.246	-80.56456	28.37070	28.53188	100.403	85.993	139.2

TABLE XII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S
31.0	6375.388	-80.56445	28.37068	28.53186	101.386	85.545	145.3
32.0	6375.536	-80.56433	28.37066	28.53184	102.288	85.066	151.5
33.0	6375.690	-80.56420	28.37063	28.53181	103.094	84.576	157.8
34.0	6375.850	-80.56404	28.37060	28.53178	103.797	84.069	164.2
35.0	6376.017	-80.56386	28.37056	28.53174	104.387	83.550	170.8
36.0	6376.190	-80.56366	28.37051	28.53169	104.828	83.022	177.4
37.0	6376.369	-80.56344	28.37046	28.53164	105.111	82.490	184.2
38.0	6376.555	-80.56319	28.37040	28.53158	105.273	81.966	191.1
39.0	6376.747	-80.56292	28.37033	28.53151	105.359	81.445	198.1
40.0	6376.947	-80.56261	28.37026	28.53144	105.436	80.922	205.3
41.0	6377.153	-80.56228	28.37018	28.53136	105.564	80.383	212.6
42.0	6377.366	-80.56192	28.37009	28.53127	105.742	79.817	220.0
43.0	6377.586	-80.56152	28.36999	28.53117	105.945	79.227	227.5
44.0	6377.813	-80.56108	28.36988	28.53105	106.116	78.620	235.2
45.0	6378.047	-80.56061	28.36976	28.53093	106.241	78.020	243.1
46.0	6378.289	-80.56010	28.36963	28.53080	106.157	77.416	251.0
47.0	6378.537	-80.55954	28.36949	28.53066	106.084	76.812	259.0
48.0	6378.793	-80.55894	28.36933	28.53050	106.020	76.255	267.3
49.0	6379.056	-80.55830	28.36917	28.53034	106.044	75.652	275.7
50.0	6379.327	-80.55760	28.36899	28.53016	105.989	75.090	284.2
51.0	6379.606	-80.55686	28.36880	28.52998	105.937	74.505	292.9
52.0	6379.892	-80.55607	28.36861	28.52978	105.823	73.942	301.7
53.0	6380.185	-80.55523	28.36840	28.52957	105.659	73.424	310.4
54.0	6380.487	-80.55433	28.36818	28.52935	105.452	72.877	319.1
MACH ONE							
54.006	6380.488	-80.55433	28.36818	28.52935	105.451	72.874	319.1
55.0	6380.795	-80.55338	28.36795	28.52912	105.268	72.366	327.6
56.0	6381.111	-80.55238	28.36771	28.52887	105.268	71.822	336.0
57.0	6381.433	-80.55132	28.36745	28.52862	105.268	71.237	344.6
58.0	6381.763	-80.55020	28.36718	28.52835	105.317	70.655	353.3
59.0	6382.100	-80.54902	28.36690	28.52806	105.315	70.049	362.2
60.0	6382.444	-80.54777	28.36660	28.52776	105.313	69.472	371.3
61.0	6382.795	-80.54646	28.36628	28.52744	105.251	68.866	380.6
62.0	6383.154	-80.54507	28.36595	28.52711	105.164	68.264	390.3
63.0	6383.521	-80.54361	28.36560	28.52676	105.066	67.652	400.3
64.0	6383.895	-80.54208	28.36524	28.52639	104.972	67.037	410.6
65.0	6384.277	-80.54046	28.36486	28.52601	104.898	66.431	421.2

TABLE XII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S
66.0	6384.667	-80.53876	28.36446	28.52562	104.857	65.838	432.1
MAXIMUM DYNAMIC PRESSURE							
67.000	6385.066	-80.53697	28.36404	28.52520	104.851	65.255	443.3
68.0	6385.473	-80.53510	28.36361	28.52476	104.878	64.683	454.9
69.0	6385.888	-80.53314	28.36315	28.52430	104.929	64.115	466.8
70.0	6386.313	-80.53109	28.36266	28.52381	104.993	63.552	479.0
71.0	6386.746	-80.52894	28.36216	28.52330	105.050	62.992	491.5
72.0	6387.189	-80.52670	28.36162	28.52277	105.091	62.433	504.4
73.0	6387.641	-80.52435	28.36107	28.52221	105.119	61.880	517.7
74.0	6388.102	-80.52190	28.36048	28.52162	105.146	61.331	531.3
75.0	6388.573	-80.51934	28.35987	28.52101	105.178	60.789	545.4
76.0	6389.054	-80.51666	28.35923	28.52037	105.213	60.259	559.8
77.0	6389.546	-80.51388	28.35856	28.51970	105.240	59.740	574.5
78.0	6390.047	-80.51097	28.35787	28.51900	105.250	59.233	589.7
79.0	6390.559	-80.50795	28.35714	28.51827	105.244	58.737	605.2
80.0	6391.082	-80.50480	28.35639	28.51751	105.225	58.248	621.1
81.0	6391.616	-80.50152	28.35560	28.51673	105.205	57.768	637.4
82.0	6392.161	-80.49812	28.35479	28.51591	105.192	57.295	654.1
83.0	6392.717	-80.49458	28.35394	28.51506	105.187	56.827	671.2
84.0	6393.285	-80.49090	28.35306	28.51418	105.188	56.367	688.7
85.0	6393.864	-80.48708	28.35215	28.51326	105.191	55.913	706.7
86.0	6394.456	-80.48312	28.35120	28.51231	105.195	55.465	725.0
87.0	6395.059	-80.47900	28.35022	28.51132	105.199	55.023	743.8
88.0	6395.675	-80.47474	28.34920	28.51030	105.200	54.587	762.9
89.0	6396.303	-80.47032	28.34814	28.50924	105.197	54.157	782.5
90.0	6396.944	-80.46574	28.34705	28.50814	105.196	53.734	802.5
91.0	6397.597	-80.46100	28.34591	28.50700	105.194	53.317	822.8
92.0	6398.264	-80.45609	28.34474	28.50582	105.192	52.906	843.6
93.0	6398.943	-80.45100	28.34353	28.50460	105.192	52.501	864.8
94.0	6399.636	-80.44575	28.34227	28.50334	105.195	52.099	886.4
95.0	6400.342	-80.44031	28.34097	28.50204	105.201	51.702	908.5
96.0	6401.062	-80.43470	28.33963	28.50069	105.211	51.309	930.9
97.0	6401.796	-80.42889	28.33824	28.49929	105.222	50.921	953.8
98.0	6402.544	-80.42290	28.33680	28.49785	105.234	50.541	977.1
99.0	6403.305	-80.41671	28.33532	28.49637	105.243	50.169	1000.9
100.0	6404.080	-80.41033	28.33379	28.49483	105.251	49.804	1025.1
101.0	6404.870	-80.40374	28.33221	28.49325	105.259	49.446	1049.7

TABLE XII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S
102.0	6405.674	-80.39695	28.33058	28.49161	105.266	49.093	1074.7
103.0	6406.494	-80.38995	28.32890	28.48993	105.271	48.746	1100.2
104.0	6407.329	-80.38273	28.32717	28.48818	105.278	48.404	1126.2
105.0	6408.179	-80.37530	28.32538	28.48639	105.286	48.068	1152.6
106.0	6409.044	-80.36764	28.32354	28.48454	105.296	47.738	1179.5
107.0	6409.925	-80.35975	28.32164	28.48263	105.307	47.414	1206.8
108.0	6410.821	-80.35164	28.31968	28.48067	105.318	47.096	1234.6
109.0	6411.734	-80.34329	28.31767	28.47865	105.329	46.784	1263.0
110.0	6412.663	-80.33471	28.31559	28.47657	105.339	46.478	1291.8
111.0	6413.608	-80.32588	28.31346	28.47443	105.349	46.178	1321.2
112.0	6414.569	-80.31680	28.31127	28.47223	105.359	45.883	1351.0
113.0	6415.548	-80.30748	28.30901	28.46996	105.370	45.593	1381.4
114.0	6416.543	-80.29789	28.30669	28.46763	105.382	45.308	1412.3
115.0	6417.556	-80.28805	28.30430	28.46524	105.395	45.028	1443.8
116.0	6418.587	-80.27794	28.30185	28.46278	105.408	44.753	1475.9
117.0	6419.635	-80.26756	28.29933	28.46025	105.420	44.482	1508.5
118.0	6420.701	-80.25690	28.29674	28.45765	105.433	44.217	1541.7
119.0	6421.785	-80.24597	28.29408	28.45498	105.446	43.957	1575.5
120.0	6422.888	-80.23475	28.29135	28.45224	105.459	43.702	1609.9
121.0	6424.010	-80.22324	28.28855	28.44942	105.472	43.451	1645.0
122.0	6425.151	-80.21143	28.28567	28.44654	105.486	43.205	1680.7
123.0	6426.312	-80.19932	28.28272	28.44357	105.499	42.964	1717.0
124.0	6427.492	-80.18691	28.27968	28.44053	105.511	42.727	1754.1
125.0	6428.693	-80.17418	28.27657	28.43740	105.524	42.495	1791.8
126.0	6429.914	-80.16114	28.27338	28.43420	105.537	42.268	1830.3
127.0	6431.155	-80.14777	28.27011	28.43091	105.549	42.044	1869.5
128.0	6432.418	-80.13408	28.26675	28.42754	105.562	41.825	1909.4
129.0	6433.702	-80.12004	28.26330	28.42409	105.574	41.610	1950.2
130.0	6435.008	-80.10567	28.25977	28.42054	105.586	41.399	1991.7
131.0	6436.337	-80.09095	28.25615	28.41691	105.597	41.192	2034.1
132.0	6437.688	-80.07587	28.25245	28.41319	105.609	40.989	2077.3
133.0	6439.062	-80.06043	28.24865	28.40937	105.621	40.791	2121.4
134.0	6440.460	-80.04461	28.24475	28.40546	105.632	40.596	2166.4
135.0	6441.882	-80.02843	28.24076	28.40146	105.644	40.406	2212.3
136.0	6443.329	-80.01185	28.23667	28.39735	105.656	40.216	2259.3
137.0	6444.800	-79.99489	28.23248	28.39315	105.667	40.033	2307.2
138.0	6446.298	-79.97752	28.22818	28.38883	105.679	39.855	2356.1
139.0	6447.821	-79.95975	28.22378	28.38442	105.693	39.682	2406.0
140.0	6449.371	-79.94156	28.21928	28.37990	105.705	39.516	2457.1
141.0	6450.948	-79.92295	28.21467	28.37527	105.717	39.355	2509.5

TABLE XII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S
INBOARD ENGINE CUTØFF							
142.000	6452.554	-79.90391	28.20994	28.37053	105.732	39.205	2562.8
143.0	6454.184	-79.88448	28.20512	28.36568	105.746	39.062	2596.1
144.0	6455.826	-79.86482	28.20023	28.36078	105.760	38.925	2621.5
145.0	6457.478	-79.84494	28.19528	28.35581	105.774	38.790	2646.2
146.0	6459.142	-79.82485	28.19028	28.35079	105.788	38.658	2670.9
147.0	6460.816	-79.80454	28.18521	28.34571	105.802	38.528	2696.1
148.0	6462.501	-79.78401	28.18009	28.34056	105.817	38.403	2721.2
ØUTBOARD ENGINE CUTØFF							
148.050	6462.585	-79.78298	28.17983	28.34031	105.818	38.397	2722.4
149.0	6464.191	-79.76333	28.17492	28.33538	105.833	38.274	2723.6
150.0	6465.875	-79.74265	28.16975	28.33019	105.849	38.143	2718.8
155.0	6474.186	-79.63920	28.14380	28.30414	105.923	37.488	2709.9
160.0	6482.381	-79.53498	28.11752	28.27776	105.997	36.846	2714.8
165.0	6490.473	-79.42986	28.09088	28.25102	106.070	36.218	2720.8
GUIDANCE INITIATION							
166.690	6493.184	-79.39413	28.08180	28.24190	106.094	36.007	2723.0
170.0	6498.461	-79.32387	28.06388	28.22392	106.144	35.598	2727.6
175.0	6506.354	-79.21702	28.03651	28.19645	106.229	35.034	2735.0
180.0	6514.162	-79.10936	28.00877	28.16861	106.313	34.499	2742.7
185.0	6521.888	-79.00089	27.98066	28.14039	106.397	33.956	2751.2
190.0	6529.529	-78.89157	27.95218	28.11180	106.479	33.409	2760.4
195.0	6537.087	-78.78138	27.92330	28.08282	106.561	32.859	2770.4
200.0	6544.561	-78.67029	27.89404	28.05344	106.641	32.308	2781.1
205.0	6551.951	-78.55829	27.86437	28.02367	106.721	31.759	2792.4
210.0	6559.259	-78.44536	27.83430	27.99348	106.802	31.212	2804.5
215.0	6566.485	-78.33147	27.80381	27.96288	106.880	30.668	2817.3
220.0	6573.629	-78.21661	27.77289	27.93184	106.959	30.124	2831.0
225.0	6580.693	-78.10075	27.74155	27.90038	107.037	29.582	2845.3
230.0	6587.676	-77.98387	27.70977	27.86848	107.115	29.043	2860.4
235.0	6594.579	-77.86595	27.67754	27.83613	107.192	28.504	2876.2

TABLE XII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S
240.0	6601.402	-77.74697	27.64486	27.80332	107.271	27.968	2892.8
245.0	6608.145	-77.62691	27.61171	27.77004	107.349	27.434	2910.0
250.0	6614.809	-77.50574	27.57808	27.73628	107.427	26.903	2927.9
255.0	6621.394	-77.38346	27.54397	27.70204	107.506	26.376	2946.6
260.0	6627.900	-77.26003	27.50937	27.66731	107.584	25.852	2966.1
265.0	6634.328	-77.13544	27.47426	27.63206	107.664	25.331	2986.2
270.0	6640.677	-77.00968	27.43864	27.59630	107.741	24.814	3007.2
275.0	6646.948	-76.88270	27.40249	27.56002	107.820	24.298	3028.9
280.0	6653.141	-76.75450	27.36581	27.52320	107.898	23.787	3051.3
285.0	6659.256	-76.62504	27.32859	27.48583	107.978	23.284	3074.6
290.0	6665.294	-76.49432	27.29081	27.44790	108.056	22.783	3098.7
295.0	6671.255	-76.36230	27.25246	27.40941	108.137	22.284	3123.5
300.0	6677.139	-76.22896	27.21353	27.37033	108.217	21.790	3149.2
305.0	6682.945	-76.09428	27.17401	27.33065	108.298	21.301	3175.8
310.0	6688.675	-75.95822	27.13389	27.29037	108.377	20.816	3203.2
315.0	6694.328	-75.82077	27.09315	27.24947	108.459	20.334	3231.4
320.0	6699.905	-75.68190	27.05177	27.20794	108.540	19.860	3260.5
325.0	6705.405	-75.54158	27.00976	27.16575	108.622	19.391	3290.5
330.0	6710.830	-75.39980	26.96708	27.12291	108.704	18.926	3321.3
335.0	6716.178	-75.25651	26.92374	27.07939	108.785	18.462	3353.0
340.0	6721.449	-75.11169	26.87971	27.03519	108.867	18.008	3385.6
345.0	6726.644	-74.96532	26.83498	26.99028	108.951	17.561	3419.1
350.0	6731.765	-74.81738	26.78953	26.94465	109.036	17.118	3453.4
355.0	6736.809	-74.66784	26.74335	26.89829	109.120	16.679	3488.6
360.0	6741.778	-74.51666	26.69643	26.85118	109.204	16.247	3524.8
365.0	6746.670	-74.36383	26.64875	26.80331	109.288	15.818	3561.8
370.0	6751.487	-74.20931	26.60029	26.75466	109.373	15.394	3599.8
375.0	6756.226	-74.05307	26.55104	26.70521	109.458	14.977	3638.6
380.0	6760.890	-73.89510	26.50099	26.65496	109.544	14.565	3678.5
385.0	6765.477	-73.73535	26.45011	26.60387	109.630	14.157	3719.3
390.0	6769.986	-73.57379	26.39838	26.55194	109.716	13.755	3761.0
395.0	6774.419	-73.41041	26.34580	26.49914	109.803	13.355	3803.7
400.0	6778.773	-73.24515	26.29233	26.44546	109.890	12.962	3847.5
405.0	6783.049	-73.07800	26.23797	26.39087	109.978	12.577	3892.2
410.0	6787.248	-72.90892	26.18269	26.33537	110.066	12.195	3938.0
415.0	6791.368	-72.73788	26.12648	26.27892	110.155	11.819	3984.8
420.0	6795.409	-72.56485	26.06931	26.22152	110.244	11.447	4032.6
425.0	6799.371	-72.38980	26.01116	26.16313	110.334	11.080	4081.5
430.0	6803.254	-72.21268	25.95202	26.10374	110.422	10.720	4131.5
435.0	6807.056	-72.03347	25.89186	26.04333	110.513	10.365	4182.6

TABLE XII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST KM	LONG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S
440.0	6810.779	-71.85212	25.83066	25.98188	110.604	10.015	4234.8
445.0	6814.420	-71.66861	25.76839	25.91935	110.696	9.668	4288.2
450.0	6817.980	-71.48290	25.70504	25.85573	110.788	9.327	4342.7
455.0	6821.458	-71.29495	25.64057	25.79100	110.880	8.991	4398.4
460.0	6824.854	-71.10471	25.57498	25.72513	110.973	8.660	4455.3
465.0	6828.167	-70.91216	25.50822	25.65808	111.067	8.333	4513.4
470.0	6831.395	-70.71726	25.44027	25.58985	111.161	8.011	4572.6
475.0	6834.540	-70.51996	25.37111	25.52040	111.257	7.694	4633.2
480.0	6837.599	-70.32022	25.30071	25.44970	111.352	7.382	4695.0
485.0	6840.572	-70.11801	25.22904	25.37773	111.449	7.074	4758.3
490.0	6843.459	-69.91327	25.15608	25.30445	111.546	6.772	4822.8
495.0	6846.259	-69.70596	25.08178	25.22984	111.643	6.474	4888.8
500.0	6848.970	-69.49604	25.00613	25.15386	111.741	6.179	4956.3
505.0	6851.593	-69.28345	24.92908	25.07648	111.840	5.889	5025.2
510.0	6854.127	-69.06815	24.85061	24.99767	111.938	5.605	5095.6
515.0	6856.569	-68.85008	24.77068	24.91739	112.040	5.322	5167.6
520.0	6858.920	-68.62920	24.68926	24.83561	112.140	5.045	5241.2
525.0	6861.178	-68.40546	24.60631	24.75230	112.242	4.773	5316.4
530.0	6863.343	-68.17879	24.52179	24.66740	112.344	4.505	5393.2
535.0	6865.414	-67.94914	24.43566	24.58090	112.447	4.240	5471.8
540.0	6867.389	-67.71645	24.34789	24.49274	112.550	3.980	5552.2
545.0	6869.267	-67.48067	24.25843	24.40288	112.655	3.722	5634.5
550.0	6871.046	-67.24172	24.16724	24.31129	112.760	3.469	5718.7
555.0	6872.727	-66.99955	24.07427	24.21790	112.865	3.219	5804.9
560.0	6874.306	-66.75408	23.97948	24.12268	112.972	2.973	5893.1
565.0	6875.782	-66.50525	23.88281	24.02558	113.079	2.730	5983.5
570.0	6877.154	-66.25297	23.78423	23.92655	113.186	2.489	6076.1
575.0	6878.420	-65.99718	23.68367	23.82554	113.295	2.252	6171.0
580.0	6879.578	-65.73779	23.58108	23.72248	113.404	2.017	6268.4
585.0	6880.625	-65.47472	23.47641	23.61733	113.515	1.781	6368.1
590.0	6881.558	-65.20789	23.36959	23.51002	113.626	1.549	6470.3
595.0	6882.373	-64.93721	23.26057	23.40050	113.737	1.318	6575.1
600.0	6883.070	-64.66260	23.14928	23.28870	113.850	1.090	6682.8
605.0	6883.643	-64.38394	23.03566	23.17455	113.963	0.862	6793.4
610.0	6884.092	-64.10115	22.91962	23.05797	114.079	0.640	6907.3
615.0	6884.414	-63.81410	22.80110	22.93889	114.193	0.420	7024.3
620.0	6884.604	-63.52269	22.68002	22.81724	114.309	0.195	7144.5

S-IV GUIDANCE CUTOFF

624.151	6884.655	-63.27736	22.57751	22.71424	114.406	0.003	7247.0
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TABLE XII
 GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S
625.0	6884.655	-63.22685	22.55634	22.69297	114.428	-0.002	7249.8
630.0	6884.654	-62.92972	22.43127	22.56731	114.558	0.004	7249.9

INSERTIØN

634.151	6884.657	-62.68349	22.32697	22.46252	114.666	0.009	7250.0
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TABLE XIII
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL M/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES N/CM SQ	RANGE M	ALTITUDE M
FIRST MOTION							
-0.180	408.9	0.	90.000	0.013	0.001	0	32
LIFTOFF SIGNAL							
0.078	409.0	0.111	90.005	0.013	0.001	0	32
1.0	409.1	0.529	90.014	0.017	0.002	0	34
2.0	409.1	1.011	90.014	0.025	0.004	0	40
3.0	409.1	1.514	90.008	0.034	0.008	0	48
4.0	409.1	2.032	90.000	0.044	0.014	0	61
5.0	409.2	2.560	89.991	0.055	0.021	0	77
6.0	409.3	3.098	89.983	0.066	0.030	0	98
7.0	409.4	3.645	89.976	0.077	0.041	0	122
8.0	409.6	4.200	89.970	0.088	0.055	-0	150
9.0	409.9	4.764	89.964	0.100	0.070	-0	182
10.0	410.2	5.337	89.958	0.112	0.087	-1	218
11.0	410.6	5.921	89.951	0.124	0.106	-2	258
12.0	411.0	6.515	89.944	0.136	0.128	-3	302
13.0	411.6	7.120	89.937	0.149	0.152	-3	351
14.0	412.2	7.735	89.930	0.162	0.178	-4	404
15.0	412.9	8.360	89.924	0.175	0.207	-5	462
16.0	413.8	8.994	89.918	0.188	0.239	-5	524
17.0	414.7	9.636	89.914	0.202	0.272	-6	591
18.0	415.8	10.285	89.913	0.216	0.309	-6	663
19.0	417.0	10.940	89.915	0.231	0.348	-7	740
20.0	418.4	11.599	89.921	0.245	0.390	-7	822
21.0	419.9	12.262	89.932	0.260	0.434	-6	908
22.0	421.6	12.929	89.947	0.275	0.481	-6	1000
23.0	423.4	13.598	89.967	0.291	0.531	-6	1097
24.0	425.4	14.270	89.992	0.306	0.583	8	1199
25.0	427.6	14.945	90.022	0.323	0.639	10	1306
26.0	429.9	15.623	90.057	0.339	0.697	13	1419
27.0	432.4	16.304	90.095	0.356	0.758	17	1538
28.0	435.1	16.988	90.138	0.373	0.820	23	1662
29.0	438.0	17.673	90.186	0.391	0.886	30	1792
30.0	441.1	18.354	90.240	0.409	0.954	39	1928

TABLE XIII
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL M/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES N/CM SQ	RANGE M	ALTITUDE M
31.0	444.4	19.028	90.304	0.428	1.025	49	2070
32.0	448.0	19.691	90.377	0.447	1.099	61	2218
33.0	451.8	20.348	90.457	0.466	1.174	74	2372
34.0	455.9	20.997	90.545	0.486	1.251	90	2532
35.0	460.1	21.638	90.638	0.506	1.330	107	2699
36.0	464.6	22.270	90.735	0.526	1.411	127	2872
37.0	469.4	22.893	90.831	0.548	1.493	150	3051
38.0	474.3	23.508	90.927	0.570	1.579	175	3237
39.0	479.5	24.115	91.022	0.592	1.666	203	3429
40.0	484.9	24.710	91.121	0.615	1.753	234	3629
41.0	490.5	25.293	91.231	0.637	1.838	267	3835
42.0	496.5	25.857	91.353	0.660	1.920	304	4048
43.0	502.7	26.402	91.487	0.683	2.000	345	4268
44.0	509.2	26.928	91.626	0.707	2.083	389	4495
45.0	516.0	27.446	91.766	0.731	2.163	437	4729
46.0	522.9	27.932	91.887	0.757	2.250	489	4970
47.0	530.2	28.406	92.012	0.783	2.337	546	5219
48.0	537.5	28.886	92.134	0.812	2.428	607	5475
49.0	545.3	29.334	92.277	0.840	2.517	673	5738
50.0	553.1	29.777	92.405	0.870	2.604	743	6009
51.0	561.2	30.194	92.539	0.901	2.694	819	6287
52.0	569.5	30.601	92.660	0.933	2.785	899	6573
53.0	577.7	30.992	92.766	0.967	2.875	985	6867
54.0	586.1	31.348	92.866	1.000	2.952	1076	7168
MACH ONE							
54.006	586.2	31.350	92.867	1.000	2.952	1077	7170
55.0	594.4	31.682	92.961	1.032	3.018	1172	7476
56.0	602.8	31.980	93.095	1.062	3.060	1274	7792
57.0	611.5	32.243	93.235	1.091	3.092	1382	8114
58.0	620.4	32.497	93.387	1.124	3.132	1495	8444
59.0	629.7	32.732	93.533	1.159	3.180	1615	8781
60.0	639.1	32.961	93.677	1.192	3.204	1742	9125
61.0	648.9	33.170	93.811	1.227	3.228	1875	9476
62.0	659.1	33.375	93.939	1.265	3.254	2016	9835
63.0	669.6	33.565	94.066	1.304	3.278	2164	10201
64.0	680.6	33.746	94.194	1.346	3.304	2319	10575
65.0	691.8	33.922	94.326	1.389	3.319	2483	10957

TABLE XIII
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL M/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES N/CM SQ	RANGE M	ALTITUDE M
66.0	703.3	34.095	94.466	1.440	3.359	2655	11347
	MAXIMUM DYNAMIC PRESSURE						
67.000	715.1	34.266	94.616	1.487	3.371	2836	11746
68.0	727.2	34.432	94.777	1.534	3.363	3026	12152
69.0	739.7	34.592	94.946	1.581	3.344	3224	12568
70.0	752.5	34.743	95.121	1.634	3.336	3432	12992
71.0	765.7	34.887	95.295	1.684	3.304	3650	13426
72.0	779.2	35.020	95.465	1.734	3.256	3877	13868
73.0	793.2	35.145	95.631	1.787	3.212	4115	14320
74.0	807.5	35.263	95.797	1.840	3.152	4364	14781
75.0	822.2	35.375	95.966	1.896	3.093	4624	15252
76.0	837.3	35.482	96.135	1.951	3.023	4895	15733
77.0	852.8	35.585	96.300	2.003	2.934	5178	16224
78.0	868.6	35.684	96.457	2.059	2.850	5472	16725
79.0	884.9	35.777	96.606	2.106	2.737	5779	17237
80.0	901.5	35.865	96.747	2.162	2.642	6099	17760
81.0	918.5	35.946	96.887	2.217	2.546	6431	18293
82.0	935.9	36.022	97.028	2.268	2.435	6776	18838
83.0	953.8	36.091	97.171	2.317	2.322	7136	19394
84.0	972.0	36.155	97.316	2.376	2.224	7509	19961
85.0	990.7	36.212	97.460	2.424	2.109	7896	20540
86.0	1009.8	36.263	97.604	2.481	2.012	8298	21132
87.0	1029.3	36.307	97.745	2.531	1.902	8715	21735
88.0	1049.2	36.345	97.884	2.588	1.810	9148	22350
89.0	1069.5	36.376	98.018	2.653	1.726	9596	22978
90.0	1090.2	36.403	98.152	2.720	1.641	10061	23618
91.0	1111.4	36.423	98.283	2.789	1.558	10542	24271
92.0	1132.9	36.438	98.412	2.821	1.440	11040	24938
93.0	1154.9	36.446	98.540	2.881	1.358	11556	25617
94.0	1177.3	36.449	98.668	2.940	1.272	12089	26309
95.0	1200.2	36.445	98.796	3.008	1.201	12640	27015
96.0	1223.5	36.435	98.924	3.092	1.140	13210	27735
97.0	1247.2	36.420	99.051	3.168	1.073	13799	28468
98.0	1271.3	36.402	99.176	3.248	1.009	14407	29215
99.0	1295.8	36.382	99.298	3.288	0.919	15035	29975
100.0	1320.8	36.358	99.417	3.344	0.853	15683	30750
101.0	1346.2	36.331	99.533	3.431	0.802	16351	31540

TABLE XIII
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL M/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES N/CM SQ	RANGE M	ALTITUDE M
102.0	1372.0	36.301	99.647	3.493	0.742	17040	32344
103.0	1398.3	36.266	99.758	3.572	0.688	17751	33163
104.0	1425.0	36.229	99.868	3.640	0.631	18483	33997
105.0	1452.2	36.189	99.977	3.711	0.586	19238	34847
106.0	1479.8	36.147	100.085	3.803	0.545	20016	35711
107.0	1508.0	36.102	100.192	3.871	0.500	20816	36592
108.0	1536.5	36.056	100.297	3.928	0.455	21640	37488
109.0	1565.6	36.008	100.400	3.981	0.414	22487	38399
110.0	1595.2	35.959	100.501	4.063	0.382	23359	39327
111.0	1625.2	35.909	100.600	4.159	0.354	24255	40272
112.0	1655.8	35.857	100.697	4.187	0.316	25177	41233
113.0	1686.9	35.803	100.793	4.257	0.288	26125	42211
114.0	1718.6	35.748	100.889	4.338	0.263	27098	43205
115.0	1750.7	35.692	100.983	4.398	0.238	28098	44218
116.0	1783.5	35.635	101.076	4.500	0.219	29125	45247
117.0	1816.8	35.576	101.167	4.604	0.201	30179	46294
118.0	1850.7	35.517	101.256	4.708	0.184	31262	47360
119.0	1885.2	35.458	101.345	4.804	0.167	32373	48443
120.0	1920.2	35.398	101.432	4.933	0.153	33513	49546
121.0	1955.9	35.338	101.518	5.064	0.140	34683	50667
122.0	1992.3	35.278	101.602	5.162	0.126	35883	51807
123.0	2029.3	35.217	101.685	5.288	0.114	37114	52967
124.0	2066.9	35.156	101.766	5.390	0.102	38376	54146
125.0	2105.3	35.096	101.846	5.488	0.091	39670	55345
126.0	2144.3	35.036	101.925	5.657	0.085	40996	56565
127.0	2184.1	34.976	102.002	5.832	0.078	42355	57806
128.0	2224.7	34.915	102.078	6.015	0.069	43748	59067
129.0	2266.0	34.855	102.153	6.203	0.060	45175	60351
130.0	2308.1	34.795	102.227	6.386	0.053	46637	61656
131.0	2351.0	34.736	102.299	6.577	0.047	48135	62983
132.0	2394.8	34.677	102.370	6.775	0.041	49669	64333
133.0	2439.4	34.619	102.440	6.981	0.036	51240	65706
134.0	2485.0	34.562	102.509	7.196	0.031	52848	67103
135.0	2531.4	34.505	102.578	7.419	0.027	54496	68524
136.0	2579.0	34.447	102.645	7.651	0.023	56182	69969
137.0	2627.4	34.392	102.711	7.891	0.019	57909	71439
138.0	2676.8	34.338	102.776	8.140	0.016	59677	72935
139.0	2727.2	34.286	102.843	8.398	0.014	61486	74457
140.0	2778.8	34.239	102.906	8.667	0.011	63338	76005
141.0	2831.6	34.194	102.969	8.948	0.009	65233	77581

TABLE XIII
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL M/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES N/CM SQ	RANGE M	ALTITUDE M
INBOARD ENGINE CUTOFF							
142.000	2885.3	34.155	103.033	9.241	0.007	67172	79186
143.0	2919.1	34.086	103.077	9.473	0.006	69151	80814
144.0	2945.0	34.006	103.114	9.686	0.005	71153	82454
145.0	2970.2	33.927	103.150	9.821	0.003	73178	84105
146.0	2995.4	33.848	103.186	9.913	0.003	75225	85767
147.0	3021.1	33.772	103.221	10.006	0.002	77294	87440
148.0	3046.6	33.699	103.257	10.099	0.001	79387	89123
OUTBOARD ENGINE CUTOFF							
148.050	3047.9	33.696	103.258	10.104	0.001	79491	89208
149.0	3049.6	33.587	103.275	10.041	0.001	81494	90812
150.0	3045.5	33.462	103.288	9.888	0.001	83602	92494
155.0	3039.5	32.861	103.359	9.227	0.000	94151	100797
160.0	3047.1	32.293	103.441	8.471	0.000	104784	108984
165.0	3055.9	31.740	103.521	7.456	0.000	115516	117067
GUIDANCE INITIATION							
166.690	3059.0	31.555	103.548	7.175	0.000	119164	119776
170.0	3065.4	31.195	103.603	6.333	0.000	126342	125047
175.0	3075.1	30.701	103.692	5.482	0.000	137265	132932
180.0	3085.1	30.234	103.780	4.914	0.000	148278	140732
185.0	3095.8	29.760	103.868	4.501	0.000	159382	148448
190.0	3107.3	29.284	103.956	4.246	0.000	170579	156081
195.0	3119.5	28.806	104.043	4.081	0.000	181874	163630
200.0	3132.4	28.328	104.130	3.975	0.000	193269	171094
205.0	3145.9	27.852	104.217	3.909	0.000	204765	178476
210.0	3160.2	27.380	104.304	3.849	0.000	216366	185774
215.0	3175.1	26.910	104.390	3.803	0.000	228072	192991
220.0	3190.8	26.441	104.477	3.772	0.000	239887	200125
225.0	3207.1	25.975	104.563	3.745	0.000	251813	207179
230.0	3224.2	25.511	104.650	3.720	0.000	263852	214153
235.0	3242.0	25.048	104.736	3.697	0.000	276007	221045

TABLE XIII
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL M/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES N/CM SQ	RANGE M	ALTITUDE M
240.0	3260.5	24.588	104.823	3.677	0.000	288281	227858
245.0	3279.6	24.130	104.911	3.665	0.000	300674	234592
250.0	3299.4	23.675	104.998	3.656	0.000	313191	241245
255.0	3319.9	23.223	105.086	3.650	0.000	325833	247820
260.0	3341.1	22.775	105.175	3.645	0.000	338602	254315
265.0	3363.0	22.328	105.264	3.641	0.000	351502	260732
270.0	3385.6	21.886	105.352	3.639	0.000	364533	267070
275.0	3409.0	21.445	105.442	3.639	0.000	377700	273330
280.0	3433.1	21.008	105.530	3.640	0.000	391004	279512
285.0	3457.9	20.577	105.621	3.642	0.000	404448	285616
290.0	3483.5	20.149	105.710	3.646	0.000	418035	291642
295.0	3509.9	19.722	105.801	3.651	0.000	431768	297592
300.0	3537.0	19.299	105.893	3.660	0.000	445649	303464
305.0	3565.0	18.881	105.986	3.672	0.000	459681	309258
310.0	3593.8	18.466	106.076	3.685	0.000	473868	314976
315.0	3623.4	18.054	106.169	3.699	0.000	488212	320617
320.0	3653.9	17.647	106.263	3.715	0.000	502717	326180
325.0	3685.1	17.245	106.357	3.731	0.000	517386	331668
330.0	3717.1	16.846	106.451	3.749	0.000	532220	337080
335.0	3750.1	16.448	106.544	3.768	0.000	547225	342415
340.0	3783.8	16.058	106.639	3.788	0.000	562403	347672
345.0	3818.4	15.674	106.735	3.809	0.000	577757	352854
350.0	3853.9	15.293	106.833	3.831	0.000	593291	357961
355.0	3890.2	14.915	106.929	3.854	0.000	609007	362991
360.0	3927.4	14.542	107.026	3.879	0.000	624909	367946
365.0	3965.4	14.172	107.123	3.904	0.000	641001	372824
370.0	4004.3	13.806	107.221	3.931	0.000	657285	377626
375.0	4044.2	13.445	107.319	3.959	0.000	673766	382351
380.0	4084.9	13.088	107.418	3.987	0.000	690446	387000
385.0	4126.6	12.735	107.517	4.017	0.000	707330	391571
390.0	4169.2	12.385	107.617	4.048	0.000	724422	396065
395.0	4212.8	12.038	107.717	4.081	0.000	741725	400482
400.0	4257.3	11.696	107.818	4.117	0.000	759243	404820
405.0	4302.8	11.360	107.919	4.154	0.000	776980	409081
410.0	4349.3	11.027	108.021	4.193	0.000	794941	413263
415.0	4396.8	10.697	108.123	4.232	0.000	813128	417366
420.0	4445.3	10.372	108.226	4.273	0.000	831547	421391
425.0	4495.0	10.050	108.329	4.315	0.000	850201	425335
430.0	4545.6	9.733	108.431	4.358	0.000	869096	429200
435.0	4597.3	9.421	108.536	4.402	0.000	888235	432986

TABLE XIII
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL M/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES N/CM SQ	RANGE M	ALTITUDE M
440.0	4650.1	9.113	108.641	4.448	0.000	907623	436690
445.0	4704.1	8.806	108.746	4.494	0.000	927264	440313
450.0	4759.1	8.504	108.852	4.542	0.000	947164	443855
455.0	4815.4	8.207	108.958	4.591	0.000	967328	447314
460.0	4872.8	7.913	109.065	4.642	0.000	987759	450690
465.0	4931.3	7.623	109.173	4.693	0.000	1008464	453983
470.0	4991.0	7.336	109.281	4.747	0.000	1029448	457192
475.0	5052.0	7.053	109.391	4.801	0.000	1050715	460317
480.0	5114.3	6.774	109.500	4.857	0.000	1072271	463355
485.0	5177.9	6.499	109.611	4.914	0.000	1094121	466308
490.0	5242.9	6.227	109.722	4.973	0.000	1116272	469174
495.0	5309.3	5.959	109.833	5.033	0.000	1138730	471952
500.0	5377.0	5.694	109.946	5.095	0.000	1161501	474642
505.0	5446.3	5.433	110.058	5.158	0.000	1184590	477243
510.0	5517.1	5.175	110.171	5.223	0.000	1208006	479754
515.0	5589.4	4.919	110.287	5.290	0.000	1231754	482174
520.0	5663.2	4.668	110.402	5.359	0.000	1255842	484501
525.0	5738.6	4.421	110.517	5.429	0.000	1280276	486736
530.0	5815.8	4.177	110.634	5.501	0.000	1305064	488877
535.0	5894.6	3.936	110.751	5.575	0.000	1330213	490923
540.0	5975.2	3.698	110.869	5.651	0.000	1355732	492873
545.0	6057.7	3.462	110.988	5.729	0.000	1381628	494726
550.0	6142.1	3.229	111.107	5.809	0.000	1407910	496481
555.0	6228.4	3.000	111.227	5.891	0.000	1434587	498135
560.0	6316.8	2.773	111.349	5.976	0.000	1461668	499687
565.0	6407.3	2.549	111.470	6.064	0.000	1489163	501137
570.0	6500.1	2.326	111.592	6.155	0.000	1517081	502482
575.0	6595.1	2.107	111.716	6.249	0.000	1545434	503720
580.0	6692.6	1.889	111.840	6.345	0.000	1574231	504850
585.0	6792.4	1.670	111.965	6.443	0.000	1603484	505868
590.0	6894.6	1.454	112.091	6.545	0.000	1633204	506771
595.0	6999.5	1.239	112.218	6.649	0.000	1663403	507558
600.0	7107.3	1.025	112.345	6.756	0.000	1694093	508224
605.0	7217.9	0.812	112.474	6.867	0.000	1725288	508767
610.0	7331.8	0.603	112.604	6.981	0.000	1757003	509184
615.0	7448.8	0.396	112.734	7.098	0.000	1789251	509474
620.0	7569.1	0.184	112.865	7.219	0.000	1822048	509632

S-IV GUIDANCE CUTOFF

624.151	7671.6	0.003	112.975	7.323	0.000	1849704	509656
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TABLE XIII
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL M/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES N/CM SQ	RANGE M	ALTITUDE M
625.0	7674.3	-0.001	112.996	7.326	0.000	1855403	509650
630.0	7674.4	0.004	113.118	7.326	0.000	1888967	509616
INSERTION							
634.151	7674.5	0.008	113.219	7.326	0.000	1916833	509591

TABLE XIV
BOOSTER FREE FLIGHT TRAJECTORY

Time (sec)	XE (ft)	YE (ft)	ZE (ft)	DXE (ft/s)	DYE (ft/s)	DZE (ft/s)	Altitude (ft)	Range (nm)
160	348766	353799	3068	7021	5066	79	356699	56
180	488983	449085	4744	6998	4465	89	454721	79
200	628694	534415	6673	6972	3868	102	541663	101
220	767854	603885	8845	6942	3278	115	617615	123
240	906417	663583	11247	6913	2694	125	682644	144
260	1044337	711585	13875	6880	2110	138	736814	166
280	1181575	747953	16716	6844	1529	148	780177	187
300	1318081	772736	19757	6808	951	157	812740	209
320	1453816	785974	22992	6768	374	167	834636	230
340	1588737	787694	26411	6726	-200	174	845781	251
360	1722795	777907	29997	6680	-778	184	846220	273
380	1855952	756624	33747	6634	-1352	190	835958	294
400	1988153	723832	37644	6585	-1929	197	814980	315
420	2119360	679511	41680	6535	-2503	203	783268	337
440	2249521	623638	45840	6480	-3084	210	740794	358
460	2378586	556161	50115	6424	-3665	217	687513	380
480	2596499	477037	54495	6365	-4249	220	623383	402
500	2633212	386191	58960	6306	-4836	226	548333	423
520	2758662	283550	63507	6240	-5430	230	462300	445
540	2882786	169019	68114	6171	-6027	233	365194	468
560	3005515	42503	72772	6099	-6627	233	256926	490
580	3125479	-94613	77418	5725	-6883	223	138684	513
600	3198245	-186640	80282	1194	-1739	49	58658	527
620	3207366	-204488	80653	141	-607	7	42415	529
640	3208304	-215614	80705	-16	-509	0	31562	529
660	3207523	-225013	80686	-52	-433	-1	22156	530
680	3206417	-233117	80653	-56	-377	-2	13976	530
700	3205345	-240259	80620	-52	-338	-2	6755	530
720.9	3204324	-246936	80591	-46	-305	-1	0	530

TABLE XV
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S
FIRST MOTION						
-0.180	0	105	0	-0.	0.	-0.
LIFTOFF SIGNAL						
0.078	0	105	0	0.2	2.6	0.1
1.0	0	112	0	0.4	12.4	0.3
2.0	1	130	0	0.4	23.7	0.3
3.0	1	159	1	0.1	35.5	0.3
4.0	1	201	1	-0.2	47.6	0.2
5.0	1	254	1	-0.6	60.0	0.1
6.0	0	321	1	-0.9	72.6	0.1
7.0	-0	399	1	-1.2	85.4	0.0
8.0	-2	491	1	-1.5	98.4	-0.0
9.0	-3	596	1	-1.7	111.7	-0.1
10.0	-5	714	1	-1.9	125.2	-0.1
11.0	-8	846	2	-2.0	138.9	-0.2
12.0	-10	992	2	-2.1	153.0	-0.3
13.0	-13	1152	1	-2.1	167.4	-0.5
14.0	-15	1327	1	-1.9	182.0	-0.6
15.0	-17	1516	0	-1.7	197.0	-0.8
16.0	-18	1721	-0	-1.3	212.2	-1.0
17.0	-19	1941	-1	-0.7	227.8	-1.2
18.0	-20	2176	-3	0.1	243.6	-1.4
19.0	-19	2428	-4	1.2	259.7	-1.6
20.0	-18	2695	-6	2.4	276.0	-1.8
21.0	-15	2980	-8	4.0	292.6	-1.9
22.0	-10	3281	-10	5.9	309.5	-2.0
23.0	-3	3598	-12	8.1	326.6	-2.0
24.0	5	3934	-14	10.5	344.0	-2.0
25.0	16	4286	-16	13.3	361.8	-2.0
26.0	31	4657	-18	16.4	379.8	-1.9
27.0	49	5046	-20	19.8	398.2	-1.8
28.0	70	5454	-21	23.5	417.0	-1.7
29.0	95	5880	-23	27.6	436.2	-1.5
30.0	124	6326	-24	32.2	455.7	-1.3

TABLE XV
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S
31.0	158	6792	-25	37.3	475.3	-1.0
32.0	198	7277	-26	43.1	495.2	-0.7
33.0	244	7782	-27	49.3	515.4	-0.2
34.0	296	8308	-26	56.1	535.9	0.3
35.0	355	8854	-26	63.3	556.6	0.8
36.0	422	9421	-25	71.1	577.7	1.4
37.0	497	10010	-23	79.4	599.0	1.8
38.0	580	10619	-21	88.1	620.7	2.1
39.0	672	11251	-19	97.2	642.6	2.3
40.0	773	11905	-16	106.8	664.9	2.6
41.0	885	12581	-13	117.0	687.5	3.0
42.0	1007	13280	-10	128.1	710.3	3.6
43.0	1140	14002	-6	140.1	733.2	4.3
44.0	1286	14746	-1	152.8	756.4	5.0
45.0	1445	15515	3	166.1	780.1	5.7
46.0	1617	16306	9	180.0	803.5	5.8
47.0	1804	17122	16	194.5	827.3	5.9
48.0	2006	17961	22	209.0	851.7	6.0
49.0	2222	18825	29	224.9	876.2	6.5
50.0	2455	19714	35	240.7	900.9	6.6
51.0	2703	20627	42	257.5	925.7	6.7
52.0	2969	21565	48	274.6	950.8	6.5
53.0	3251	22528	55	291.3	975.6	6.0
54.0	3551	23516	60	309.1	1000.1	5.1
MACH ONE						
54.006	3553	23522	60	309.2	1000.3	5.1
55.0	3868	24528	65	326.5	1023.9	4.3
56.0	4204	25563	70	344.9	1047.1	4.4
57.0	4558	26621	75	364.6	1070.0	4.6
58.0	4932	27703	80	385.0	1093.2	5.0
59.0	5328	28807	85	406.6	1116.7	5.2
60.0	5744	29936	90	428.3	1140.3	5.4
61.0	6184	31088	96	451.4	1164.3	5.1
62.0	6646	32265	101	475.5	1189.0	4.5
63.0	7134	33467	105	500.7	1214.2	3.8
64.0	7647	34694	108	526.9	1239.8	3.0
65.0	8187	35947	111	554.0	1266.0	2.3

TABLE XV
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S
66.0	8754	37226	113	581.8	1292.8	1.9
MAXIMUM DYNAMIC PRESSURE						
67.000	9350	38533	115	610.4	1320.3	1.9
68.0	9974	39868	117	639.8	1348.3	2.2
69.0	10628	41230	120	670.2	1376.9	2.7
70.0	11314	42622	123	701.7	1406.1	3.5
71.0	12031	44043	127	734.2	1435.8	4.3
72.0	12781	45494	132	767.9	1466.0	5.0
73.0	13566	46976	137	802.6	1496.9	5.5
74.0	14386	48489	143	838.5	1528.4	6.0
75.0	15242	50034	149	875.5	1560.5	6.6
76.0	16136	51611	156	913.4	1593.2	7.4
77.0	17069	53221	164	952.4	1626.6	8.0
78.0	18040	54865	172	992.3	1660.8	8.4
79.0	19053	56543	181	1033.2	1695.5	8.5
80.0	20106	58257	190	1075.3	1731.0	8.4
81.0	21203	60006	198	1118.5	1767.0	8.2
82.0	22343	61792	206	1162.8	1803.8	8.1
83.0	23528	63615	214	1208.4	1841.1	8.2
84.0	24759	65475	223	1255.1	1879.0	8.4
85.0	26038	67374	231	1303.2	1917.6	8.7
86.0	27365	69311	240	1352.5	1956.7	9.0
87.0	28742	71288	250	1403.0	1996.5	9.3
88.0	30171	73305	259	1454.9	2036.8	9.5
89.0	31652	75363	269	1507.9	2077.7	9.6
90.0	33187	77461	278	1562.3	2119.1	9.8
91.0	34776	79602	288	1617.9	2161.1	9.9
92.0	36422	81784	298	1674.7	2203.6	10.1
93.0	38125	84010	309	1732.9	2246.6	10.3
94.0	39888	86279	319	1792.6	2290.1	10.5
95.0	41710	88591	330	1853.6	2334.1	10.9
96.0	43595	90948	341	1916.0	2378.6	11.4
97.0	45542	93349	353	1979.7	2423.5	12.0
98.0	47554	95796	365	2044.8	2469.1	12.6
99.0	49630	98286	377	2111.1	2515.2	13.2
100.0	51773	100823	390	2178.7	2561.9	13.7
101.0	53984	103407	403	2247.7	2609.2	14.2

TABLE XV
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S
102.0	56265	106039	416	2318.0	2657.0	14.7
103.0	58619	108721	431	2389.7	2705.3	15.2
104.0	61045	111451	447	2462.9	2754.2	15.7
105.0	63545	114230	463	2537.5	2803.6	16.3
106.0	66120	117059	479	2613.5	2853.7	16.9
107.0	68772	119938	497	2690.9	2904.4	17.7
108.0	71502	122869	515	2769.8	2955.7	18.5
109.0	74312	125851	534	2850.2	3007.6	19.3
110.0	77203	128885	553	2932.0	3060.3	20.1
111.0	80177	131972	574	3015.4	3113.6	20.8
112.0	83234	135113	595	3100.4	3167.6	21.6
113.0	86378	138309	617	3186.9	3222.3	22.5
114.0	89609	141559	640	3275.1	3277.7	23.5
115.0	92929	144865	664	3365.0	3333.9	24.5
116.0	96339	148228	689	3456.6	3390.7	25.6
117.0	99843	151648	715	3549.9	3448.4	26.6
118.0	103440	155126	743	3644.9	3506.9	27.7
119.0	107133	158663	771	3741.7	3566.2	28.9
120.0	110924	162259	800	3840.3	3626.3	30.1
121.0	114814	165916	831	3940.8	3687.4	31.3
122.0	118806	169635	863	4043.1	3749.3	32.6
123.0	122902	173416	896	4147.4	3812.1	33.8
124.0	127102	177261	930	4253.7	3876.0	35.1
125.0	131410	181169	966	4362.0	3940.9	36.4
126.0	135827	185144	1003	4472.4	4006.8	37.8
127.0	140356	189184	1042	4585.0	4073.8	39.1
128.0	144998	193293	1081	4699.7	4141.9	40.5
129.0	149756	197469	1123	4816.8	4211.2	41.8
130.0	154633	201716	1165	4936.2	4281.6	43.2
131.0	159630	206034	1209	5057.9	4353.2	44.6
132.0	164750	210424	1254	5182.1	4426.1	46.0
133.0	169996	214888	1301	5308.8	4500.4	47.5
134.0	175369	219426	1349	5438.2	4576.0	48.9
135.0	180873	224041	1398	5570.2	4653.1	50.4
136.0	186511	228734	1450	5705.6	4731.8	51.9
137.0	192286	233507	1503	5843.2	4811.8	53.4
138.0	198199	238359	1557	5983.7	4893.5	54.9
139.0	204254	243295	1613	6126.9	4976.9	56.9
140.0	210455	248315	1671	6273.2	5062.7	58.5
141.0	216803	253422	1731	6422.8	5150.6	60.1

TABLE XV
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S
INBOARD ENGINE CUTOFF						
142.000	223302	258618	1792	6574.6	5240.8	62.2
143.0	229935	263890	1855	6675.0	5290.2	63.5
144.0	236651	269198	1919	6754.8	5323.7	64.8
145.0	243445	274539	1984	6832.6	5355.6	66.0
146.0	250318	279911	2051	6910.7	5387.6	67.2
147.0	257269	285316	2118	6989.8	5420.2	68.5
148.0	264299	290753	2188	7068.5	5452.9	69.8
OUTBOARD ENGINE CUTOFF						
148.050	264652	291025	2191	7072.4	5454.5	69.8
149.0	271384	296205	2257	7089.0	5439.4	70.6
150.0	278474	301631	2328	7090.8	5411.4	71.3
155.0	314003	328379	2691	7137.4	5300.7	74.6
160.0	349895	354681	3071	7218.0	5217.7	78.1
165.0	386200	380580	3466	7299.4	5137.3	81.6
GUIDANCE INITIATION						
166.690	398560	389239	3605	7327.3	5110.5	82.7
170.0	422903	406068	3882	7381.7	5058.3	85.2
175.0	460009	431174	4320	7459.7	4986.0	90.2
180.0	497497	455931	4784	7535.5	4916.9	95.1
185.0	535369	480342	5272	7613.7	4847.1	100.1
190.0	573636	504401	5784	7693.6	4776.7	104.9
195.0	612308	528107	6321	7775.4	4705.8	109.7
200.0	651393	551458	6881	7858.7	4634.6	114.4
205.0	690897	574453	7464	7943.2	4563.3	119.1
210.0	730827	597092	8071	8029.2	4492.1	123.9
215.0	771191	619374	8701	8116.3	4420.9	128.4
220.0	811993	641300	9359	8205.5	4349.5	133.1
225.0	853246	662868	10036	8295.9	4277.8	137.6
230.0	894956	684078	10735	8387.9	4205.9	142.3
235.0	937128	704926	11458	8481.5	4133.4	146.9

TABLE XV
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S
240.0	979773	725411	12205	8576.7	4060.8	151.6
245.0	1022898	745533	12974	8673.2	3987.5	156.4
250.0	1066508	765286	13768	8771.2	3913.8	161.1
255.0	1110612	784670	14586	8870.6	3839.8	166.0
260.0	1155217	803684	15427	8971.6	3765.3	171.0
265.0	1200330	822323	16294	9074.2	3690.2	176.0
270.0	1245961	840585	17186	9178.2	3614.7	180.7
275.0	1292116	858468	18102	9284.2	3538.2	185.9
280.0	1338805	875967	19044	9391.7	3461.3	190.8
285.0	1386036	893081	20011	9500.7	3384.3	196.0
290.0	1433816	909809	21004	9611.4	3306.4	201.0
295.0	1482153	926144	22023	9724.1	3227.5	206.4
300.0	1531060	942084	23068	9838.6	3148.0	211.9
305.0	1580543	957624	24141	9955.0	3067.8	217.4
310.0	1630612	972760	25241	10073.3	2986.6	222.6
315.0	1681279	987489	26369	10193.5	2904.5	228.3
320.0	1732551	1001805	27524	10315.7	2822.0	234.0
325.0	1784438	1015707	28709	10439.6	2738.4	239.8
330.0	1836951	1029189	29922	10565.6	2653.9	245.6
335.0	1890099	1042244	31164	10694.0	2567.7	251.2
340.0	1943892	1054866	32435	10823.9	2481.1	257.2
345.0	1998341	1067053	33737	10955.8	2393.9	263.3
350.0	2053455	1078802	35070	11089.9	2305.2	269.8
355.0	2109244	1090103	36434	11225.8	2215.2	276.0
360.0	2165718	1100952	37830	11364.1	2124.1	282.3
365.0	2222888	1111341	39257	11504.1	2031.3	288.7
370.0	2280764	1121262	40717	11646.6	1937.1	295.1
375.0	2339357	1130709	42209	11791.1	1841.6	301.7
380.0	2398678	1139676	43734	11937.7	1744.8	308.3
385.0	2458738	1148154	45292	12086.6	1646.1	315.0
390.0	2519548	1156135	46883	12237.8	1545.9	321.7
395.0	2581119	1163609	48509	12391.4	1443.4	328.6
400.0	2643465	1170567	50169	12547.2	1339.5	335.6
405.0	2706596	1177002	51865	12705.4	1234.2	342.5
410.0	2770523	1182906	53595	12865.9	1126.8	349.7
415.0	2835260	1188267	55361	13028.9	1017.4	356.9
420.0	2900816	1193077	57164	13194.2	906.0	364.2
425.0	2967207	1197324	59003	13362.2	792.3	371.5
430.0	3034443	1200998	60878	13532.7	676.7	378.6
435.0	3102538	1204088	62791	13705.7	559.0	386.2

TABLE XV
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S
440.0	3171504	1206584	64741	13881.3	438.9	393.9
445.0	3241356	1208472	66729	14059.6	315.8	401.6
450.0	3312105	1209739	68757	14240.5	190.6	409.4
455.0	3383766	1210374	70823	14424.4	62.8	417.1
460.0	3456353	1210363	72928	14610.8	-67.7	425.1
465.0	3529879	1209693	75074	14799.9	-201.0	433.2
470.0	3604357	1208349	77260	14991.7	-337.4	441.4
475.0	3679802	1206315	79488	15186.6	-476.7	449.8
480.0	3756229	1203578	81758	15384.3	-619.0	458.2
485.0	3833652	1200120	84070	15585.4	-764.5	466.7
490.0	3912087	1195928	86425	15789.3	-913.2	475.4
495.0	3991551	1190983	88824	15996.7	-1065.4	484.1
500.0	4072060	1185268	91266	16207.3	-1221.4	492.9
505.0	4153630	1178764	93753	16421.2	-1381.1	501.8
510.0	4236278	1171451	96284	16638.6	-1544.4	510.6
515.0	4320022	1163311	98861	16859.4	-1712.3	520.2
520.0	4404878	1154322	101485	17083.8	-1884.0	529.4
525.0	4490866	1144465	104155	17311.8	-2059.6	538.8
530.0	4578002	1133718	106873	17543.4	-2239.9	548.3
535.0	4666307	1122058	109639	17779.0	-2425.0	558.0
540.0	4755799	1109460	112453	18018.4	-2614.7	567.7
545.0	4846498	1095900	115316	18261.9	-2810.0	577.6
550.0	4938426	1081352	118227	18509.8	-3010.4	587.6
555.0	5031603	1065788	121190	18761.8	-3216.2	597.7
560.0	5126051	1049179	124204	19018.4	-3428.0	608.1
565.0	5221794	1031498	127271	19279.5	-3645.6	618.3
570.0	5318854	1012711	130388	19545.3	-3870.2	628.5
575.0	5417256	992786	133557	19816.2	-4101.0	639.1
580.0	5517026	971690	136779	20092.1	-4338.9	649.9
585.0	5618185	949381	140055	20372.5	-4585.6	660.7
590.0	5720760	925823	143386	20658.0	-4839.4	671.7
595.0	5824776	900974	146772	20948.8	-5101.7	682.8
600.0	5930259	874791	150214	21245.4	-5372.6	694.1
605.0	6037240	847231	153713	21547.7	-5652.8	705.4
610.0	6145749	818249	157270	21857.1	-5941.5	717.3
615.0	6255819	787799	160886	22172.8	-6239.7	728.8
620.0	6367480	755829	164561	22493.8	-6551.0	740.5

S-IV GUIDANCE CUTOFF

624.151	6461408	728079	167655	22764.8	-6820.3	750.3
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TABLE XV
EARTH-FIXED PLUMBLINE POSITIONS AND VELOCITIES

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S
625.0	6480739	722276	168292	22766.8	-6845.2	751.4
630.0	6594480	687753	172062	22731.4	-6962.9	757.1
INSERTION						
634.151	6688771	658646	175214	22701.2	-7060.5	761.8

TABLE XVI
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S
FIRST MOTION						
-0.180	309.708	-3012.121	1635.232	1334.6	137.2	0.
LIFT-OFF SIGNAL						
0.078	309.764	-3012.116	1635.232	1335.0	134.9	1.1
1.0	309.967	-3012.096	1635.233	1336.1	126.4	5.6
2.0	310.187	-3012.076	1635.234	1337.0	116.6	11.0
3.0	310.407	-3012.057	1635.236	1337.9	106.4	16.7
4.0	310.627	-3012.041	1635.239	1338.6	96.0	22.6
5.0	310.848	-3012.026	1635.244	1339.4	85.3	28.7
6.0	311.068	-3012.013	1635.249	1340.2	74.4	34.8
7.0	311.289	-3012.001	1635.255	1341.0	63.3	41.1
8.0	311.510	-3011.992	1635.262	1342.0	52.1	47.4
9.0	311.730	-3011.984	1635.271	1343.0	40.6	53.8
10.0	311.952	-3011.978	1635.280	1344.0	28.9	60.4
11.0	312.173	-3011.975	1635.290	1345.2	17.1	67.0
12.0	312.394	-3011.973	1635.302	1346.4	4.9	73.8
13.0	312.616	-3011.973	1635.315	1347.8	-7.5	80.8
14.0	312.838	-3011.975	1635.329	1349.3	-20.1	87.9
15.0	313.060	-3011.980	1635.344	1351.0	-33.0	95.2
16.0	313.282	-3011.986	1635.360	1352.8	-46.1	102.5
17.0	313.505	-3011.995	1635.377	1354.9	-59.5	110.0
18.0	313.728	-3012.006	1635.396	1357.1	-73.1	117.5
19.0	313.952	-3012.019	1635.416	1359.7	-87.0	125.1
20.0	314.176	-3012.034	1635.437	1362.5	-101.2	132.8
21.0	314.400	-3012.052	1635.460	1365.6	-115.5	140.4
22.0	314.625	-3012.072	1635.484	1369.0	-130.2	148.1
23.0	314.851	-3012.095	1635.509	1372.7	-145.1	155.9
24.0	315.077	-3012.120	1635.535	1376.7	-160.3	163.6
25.0	315.304	-3012.148	1635.562	1381.1	-175.7	171.4
26.0	315.532	-3012.178	1635.591	1385.8	-191.5	179.3
27.0	315.760	-3012.211	1635.621	1390.8	-207.6	187.2
28.0	315.989	-3012.246	1635.653	1396.1	-224.1	195.3
29.0	316.220	-3012.284	1635.686	1401.8	-240.9	203.4
30.0	316.451	-3012.326	1635.720	1408.1	-258.0	211.5

TABLE XVI
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S
31.0	316.683	-3012.369	1635.755	1414.9	-275.3	219.4
32.0	316.916	-3012.416	1635.792	1422.3	-292.9	227.3
33.0	317.151	-3012.466	1635.830	1430.2	-310.8	235.2
34.0	317.387	-3012.518	1635.870	1438.6	-328.9	243.0
35.0	317.624	-3012.574	1635.910	1447.6	-347.4	250.8
36.0	317.863	-3012.633	1635.952	1457.1	-366.1	258.6
37.0	318.104	-3012.695	1635.995	1467.1	-385.0	266.5
38.0	318.346	-3012.760	1636.040	1477.5	-404.1	274.6
39.0	318.590	-3012.828	1636.086	1488.4	-423.5	282.9
40.0	318.836	-3012.899	1636.133	1499.8	-443.2	291.1
41.0	319.083	-3012.974	1636.182	1511.9	-463.2	299.2
42.0	319.333	-3013.052	1636.232	1524.8	-483.5	307.1
43.0	319.585	-3013.133	1636.283	1538.5	-504.0	314.7
44.0	319.839	-3013.217	1636.335	1552.9	-524.8	322.3
45.0	320.096	-3013.306	1636.389	1568.0	-546.0	330.0
46.0	320.356	-3013.397	1636.444	1583.8	-566.6	338.0
47.0	320.617	-3013.492	1636.500	1600.2	-587.6	345.9
48.0	320.882	-3013.591	1636.558	1616.7	-609.2	354.2
49.0	321.150	-3013.693	1636.616	1634.4	-630.9	361.9
50.0	321.420	-3013.798	1636.677	1652.1	-652.8	370.0
51.0	321.693	-3013.908	1636.738	1670.9	-674.7	377.9
52.0	321.970	-3014.020	1636.801	1690.0	-696.8	386.2
53.0	322.249	-3014.137	1636.865	1708.9	-718.4	394.7
54.0	322.532	-3014.257	1636.931	1728.7	-739.6	403.1
MACH ONE						
54.006	322.534	-3014.258	1636.931	1728.9	-739.7	403.1
55.0	322.818	-3014.380	1636.998	1748.2	-760.2	411.2
56.0	323.107	-3014.507	1637.066	1768.4	-780.7	418.0
57.0	323.400	-3014.637	1637.135	1789.8	-801.0	424.3
58.0	323.697	-3014.771	1637.206	1811.8	-821.7	430.3
59.0	323.996	-3014.908	1637.277	1835.2	-842.6	436.5
60.0	324.300	-3015.048	1637.349	1858.6	-863.5	442.7
61.0	324.608	-3015.192	1637.423	1883.6	-884.7	449.2
62.0	324.920	-3015.339	1637.497	1909.6	-906.3	456.0
63.0	325.237	-3015.490	1637.573	1936.8	-928.2	462.9
64.0	325.558	-3015.645	1637.650	1965.0	-950.5	469.8
65.0	325.883	-3015.803	1637.728	1994.1	-973.4	476.7

TABLE XVI
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S
66.0	326.214	-3015.965	1637.807	2023.9	-997.0	483.6
MAXIMUM DYNAMIC PRESSURE						
67.000	326.549	-3016.132	1637.887	2054.6	-1021.3	490.2
68.0	326.890	-3016.302	1637.968	2086.0	-1046.3	496.7
69.0	327.236	-3016.476	1638.050	2118.3	-1072.0	503.0
70.0	327.587	-3016.655	1638.134	2151.7	-1098.2	509.1
71.0	327.944	-3016.838	1638.218	2186.1	-1125.0	515.2
72.0	328.307	-3017.025	1638.303	2221.8	-1152.1	521.5
73.0	328.675	-3017.217	1638.390	2258.6	-1179.7	527.9
74.0	329.050	-3017.413	1638.477	2296.6	-1207.9	534.3
75.0	329.431	-3017.615	1638.566	2335.7	-1236.7	540.6
76.0	329.819	-3017.821	1638.655	2375.8	-1266.2	547.0
77.0	330.213	-3018.032	1638.746	2417.0	-1296.1	553.6
78.0	330.614	-3018.247	1638.837	2459.2	-1326.6	560.5
79.0	331.022	-3018.468	1638.930	2502.5	-1357.6	567.7
80.0	331.438	-3018.694	1639.024	2547.1	-1388.9	575.2
81.0	331.861	-3018.926	1639.120	2592.8	-1420.9	582.7
82.0	332.291	-3019.162	1639.216	2639.7	-1453.4	590.2
83.0	332.730	-3019.404	1639.314	2687.8	-1486.6	597.6
84.0	333.176	-3019.652	1639.413	2737.2	-1520.4	604.9
85.0	333.630	-3019.905	1639.513	2787.8	-1554.8	612.2
86.0	334.093	-3020.164	1639.615	2839.7	-1589.7	619.5
87.0	334.565	-3020.428	1639.717	2892.9	-1625.2	626.7
88.0	335.046	-3020.699	1639.821	2947.4	-1661.1	634.0
89.0	335.535	-3020.975	1639.926	3003.2	-1697.5	641.3
90.0	336.034	-3021.258	1640.032	3060.3	-1734.4	648.6
91.0	336.542	-3021.546	1640.140	3118.7	-1771.7	655.9
92.0	337.061	-3021.841	1640.248	3178.4	-1809.5	663.2
93.0	337.589	-3022.142	1640.358	3239.4	-1847.9	670.3
94.0	338.127	-3022.449	1640.469	3301.8	-1886.7	677.3
95.0	338.676	-3022.763	1640.581	3365.7	-1925.9	684.1
96.0	339.235	-3023.083	1640.694	3430.9	-1965.7	690.7
97.0	339.805	-3023.410	1640.808	3497.5	-2005.9	697.2
98.0	340.386	-3023.744	1640.924	3565.4	-2046.7	703.7
99.0	340.978	-3024.084	1641.040	3634.6	-2088.0	710.2
100.0	341.582	-3024.431	1641.158	3705.1	-2129.8	716.7
101.0	342.197	-3024.784	1641.276	3777.0	-2172.0	723.1

TABLE XVI
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S
102.0	342.825	-3025.145	1641.396	3850.3	-2214.8	729.5
103.0	343.464	-3025.513	1641.516	3925.1	-2257.9	735.9
104.0	344.117	-3025.888	1641.638	4001.2	-2301.6	742.2
105.0	344.781	-3026.271	1641.761	4078.9	-2345.8	748.3
106.0	345.459	-3026.661	1641.884	4157.9	-2390.6	754.4
107.0	346.150	-3027.058	1642.009	4238.4	-2436.0	760.4
108.0	346.854	-3027.463	1642.135	4320.4	-2481.9	766.3
109.0	347.572	-3027.875	1642.261	4403.9	-2528.5	772.1
110.0	348.304	-3028.295	1642.389	4488.9	-2575.6	778.0
111.0	349.050	-3028.723	1642.518	4575.5	-2623.4	783.9
112.0	349.810	-3029.159	1642.647	4663.7	-2671.7	789.7
113.0	350.585	-3029.602	1642.778	4753.5	-2720.7	795.4
114.0	351.375	-3030.054	1642.909	4845.0	-2770.4	801.0
115.0	352.180	-3030.514	1643.041	4938.2	-2820.7	806.5
116.0	353.001	-3030.983	1643.174	5033.1	-2871.7	811.9
117.0	353.837	-3031.460	1643.309	5129.7	-2923.4	817.3
118.0	354.689	-3031.945	1643.444	5228.2	-2975.9	822.7
119.0	355.558	-3032.440	1643.579	5328.4	-3029.1	828.1
120.0	356.443	-3032.943	1643.716	5430.5	-3083.0	833.4
121.0	357.345	-3033.454	1643.854	5534.5	-3137.8	838.6
122.0	358.265	-3033.976	1643.992	5640.4	-3193.3	843.9
123.0	359.202	-3034.506	1644.132	5748.3	-3249.7	849.1
124.0	360.157	-3035.045	1644.272	5858.2	-3307.0	854.3
125.0	361.131	-3035.594	1644.413	5970.3	-3365.2	859.6
126.0	362.123	-3036.153	1644.555	6084.4	-3424.3	864.8
127.0	363.133	-3036.722	1644.698	6200.8	-3484.4	870.1
128.0	364.164	-3037.300	1644.841	6319.5	-3545.4	875.4
129.0	365.214	-3037.889	1644.986	6440.5	-3607.5	880.7
130.0	366.284	-3038.488	1645.131	6563.9	-3670.5	886.0
131.0	367.375	-3039.097	1645.278	6689.8	-3734.7	891.3
132.0	368.486	-3039.717	1645.425	6818.1	-3800.0	896.7
133.0	369.619	-3040.348	1645.573	6949.1	-3866.5	902.2
134.0	370.774	-3040.990	1645.722	7082.8	-3934.3	907.7
135.0	371.951	-3041.644	1645.872	7219.2	-4003.2	913.2
136.0	373.150	-3042.308	1646.022	7359.0	-4073.6	918.7
137.0	374.373	-3042.985	1646.174	7501.2	-4145.2	924.4
138.0	375.620	-3043.673	1646.327	7646.5	-4218.3	930.1
139.0	376.890	-3044.374	1646.480	7794.3	-4293.1	935.8
140.0	378.186	-3045.086	1646.635	7945.6	-4369.9	942.1
141.0	379.506	-3045.812	1646.790	8100.2	-4448.4	948.7

TABLE XVI
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S
INBOARD ENGINE CUTOFF						
142.000	380.852	-3046.551	1646.947	8257.2	-4529.2	955.5
143.0	382.221	-3047.301	1647.104	8360.2	-4573.3	955.2
144.0	383.604	-3048.056	1647.261	8441.7	-4603.2	952.0
145.0	385.000	-3048.816	1647.418	8521.0	-4631.6	948.5
146.0	386.409	-3049.581	1647.574	8600.7	-4660.0	944.9
147.0	387.831	-3050.350	1647.729	8681.4	-4689.0	941.5
148.0	389.267	-3051.125	1647.884	8761.7	-4718.0	938.1
OUTBOARD ENGINE CUTOFF						
148.050	389.339	-3051.163	1647.891	8765.7	-4719.5	937.9
149.0	390.711	-3051.901	1648.037	8780.8	-4705.8	926.3
150.0	392.157	-3052.673	1648.189	8780.4	-4680.5	911.8
155.0	399.390	-3056.479	1648.911	8817.5	-4580.2	845.6
160.0	406.677	-3060.217	1649.583	8890.3	-4504.5	784.7
165.0	414.025	-3063.895	1650.205	8964.2	-4431.1	724.8
GUIDANCE INITIATION						
166.690	416.522	-3065.124	1650.403	8989.5	-4406.5	704.7
170.0	421.432	-3067.512	1650.777	9038.9	-4358.8	665.3
175.0	428.900	-3071.071	1651.300	9109.8	-4293.0	608.7
180.0	436.424	-3074.577	1651.779	9178.7	-4229.8	554.3
185.0	444.007	-3078.032	1652.212	9249.9	-4165.9	499.0
190.0	451.648	-3081.433	1652.600	9322.7	-4101.5	443.1
195.0	459.350	-3084.782	1652.941	9397.1	-4036.4	386.6
200.0	467.114	-3088.077	1653.236	9473.0	-3971.1	329.7
205.0	474.941	-3091.317	1653.484	9549.9	-3905.6	272.4
210.0	482.832	-3094.504	1653.685	9628.3	-3840.1	214.8
215.0	490.788	-3097.637	1653.838	9707.7	-3774.5	157.2
220.0	498.809	-3100.716	1653.942	9789.0	-3708.6	98.7
225.0	506.898	-3103.741	1654.000	9871.4	-3642.4	40.1
230.0	515.056	-3106.711	1654.008	9955.3	-3575.9	-19.1
235.0	523.283	-3109.626	1653.968	10040.6	-3508.9	-78.9

TABLE XVI
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S
240.0	531.581	-3112.486	1653.878	10127.3	-3441.7	-139.3
245.0	539.951	-3115.290	1653.739	10215.1	-3373.8	-200.2
250.0	548.393	-3118.038	1653.549	10304.3	-3305.6	-261.8
255.0	556.910	-3120.730	1653.308	10394.8	-3237.0	-323.8
260.0	565.501	-3123.366	1653.016	10486.7	-3168.0	-386.6
265.0	574.169	-3125.944	1652.671	10579.9	-3098.3	-450.1
270.0	582.914	-3128.465	1652.275	10674.6	-3028.1	-513.8
275.0	591.738	-3130.927	1651.825	10770.8	-2957.1	-578.8
280.0	600.641	-3133.331	1651.322	10868.4	-2885.5	-644.1
285.0	609.625	-3135.676	1650.765	10967.4	-2814.0	-710.2
290.0	618.691	-3137.962	1650.153	11067.9	-2741.4	-776.8
295.0	627.841	-3140.188	1649.486	11170.1	-2668.0	-844.7
300.0	637.075	-3142.353	1648.763	11273.8	-2594.0	-913.4
305.0	646.396	-3144.457	1647.983	11379.3	-2519.4	-982.8
310.0	655.804	-3146.499	1647.145	11486.5	-2443.7	-1052.9
315.0	665.301	-3148.479	1646.250	11595.3	-2367.2	-1124.2
320.0	674.888	-3150.395	1645.295	11705.9	-2290.3	-1196.3
325.0	684.566	-3152.248	1644.281	11818.0	-2212.4	-1269.3
330.0	694.338	-3154.036	1643.206	11931.8	-2133.5	-1343.3
335.0	704.204	-3155.759	1642.070	12047.7	-2053.0	-1418.4
340.0	714.167	-3157.415	1640.871	12165.1	-1972.2	-1494.4
345.0	724.226	-3159.004	1639.610	12284.1	-1890.7	-1571.2
350.0	734.384	-3160.526	1638.285	12404.9	-1808.0	-1649.6
355.0	744.642	-3161.979	1636.895	12527.3	-1724.0	-1728.8
360.0	755.002	-3163.363	1635.439	12651.8	-1638.8	-1809.1
365.0	765.465	-3164.676	1633.917	12777.7	-1552.1	-1890.6
370.0	776.032	-3165.917	1632.327	12905.7	-1464.1	-1973.5
375.0	786.706	-3167.086	1630.669	13035.5	-1374.9	-2057.5
380.0	797.486	-3168.180	1628.941	13167.0	-1284.3	-2142.7
385.0	808.376	-3169.199	1627.142	13300.5	-1192.1	-2229.4
390.0	819.377	-3170.141	1625.271	13435.9	-1098.4	-2317.4
395.0	830.489	-3171.006	1623.328	13573.2	-1002.5	-2407.0
400.0	841.716	-3171.791	1621.310	13712.5	-905.5	-2498.0
405.0	853.058	-3172.496	1619.216	13853.7	-806.9	-2590.2
410.0	864.517	-3173.119	1617.046	13996.9	-706.5	-2684.0
415.0	876.094	-3173.658	1614.799	14142.1	-604.2	-2779.4
420.0	887.792	-3174.112	1612.472	14289.3	-500.0	-2876.5
425.0	899.612	-3174.480	1610.064	14438.6	-393.6	-2975.2
430.0	911.556	-3174.760	1607.575	14590.1	-285.4	-3075.2
435.0	923.625	-3174.950	1605.002	14743.6	-175.3	-3177.2

TABLE XVI
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S
440.0	935.821	-3175.048	1602.345	14899.2	-63.0	-3281.0
445.0	948.146	-3175.053	1599.602	15056.9	52.0	-3386.9
450.0	960.602	-3174.962	1596.771	15216.9	169.1	-3494.5
455.0	973.191	-3174.774	1593.850	15379.3	288.7	-3603.8
460.0	985.914	-3174.486	1590.839	15543.6	410.7	-3715.4
465.0	998.773	-3174.097	1587.735	15710.0	535.2	-3828.9
470.0	1011.770	-3173.604	1584.537	15878.7	662.6	-3944.7
475.0	1024.907	-3173.006	1581.242	16049.8	792.7	-4062.6
480.0	1038.185	-3172.299	1577.850	16223.1	925.6	-4182.7
485.0	1051.608	-3171.482	1574.358	16399.1	1061.4	-4305.1
490.0	1065.175	-3170.552	1570.764	16577.4	1200.2	-4429.8
495.0	1078.891	-3169.506	1567.067	16758.5	1342.2	-4557.1
500.0	1092.757	-3168.342	1563.263	16942.0	1487.7	-4687.0
505.0	1106.775	-3167.057	1559.352	17128.2	1636.6	-4819.5
510.0	1120.947	-3165.647	1555.331	17317.2	1789.0	-4954.4
515.0	1135.276	-3164.111	1551.197	17508.6	1945.3	-5092.9
520.0	1149.764	-3162.445	1546.949	17703.0	2105.2	-5233.8
525.0	1164.412	-3160.645	1542.583	17900.1	2268.8	-5377.5
530.0	1179.224	-3158.710	1538.098	18100.1	2436.6	-5524.3
535.0	1194.202	-3156.634	1533.490	18303.0	2608.8	-5674.5
540.0	1209.348	-3154.415	1528.758	18509.0	2785.3	-5827.8
545.0	1224.665	-3152.048	1523.898	18718.0	2966.8	-5984.8
550.0	1240.155	-3149.531	1518.907	18930.4	3153.0	-6145.4
555.0	1255.821	-3146.858	1513.783	19146.0	3344.2	-6309.6
560.0	1271.666	-3144.025	1508.522	19365.0	3540.7	-6477.9
565.0	1287.693	-3141.029	1503.121	19587.5	3742.7	-6649.9
570.0	1303.904	-3137.864	1497.576	19813.6	3951.1	-6826.2
575.0	1320.303	-3134.525	1491.885	20043.4	4165.0	-7007.1
580.0	1336.893	-3131.007	1486.043	20276.9	4385.4	-7192.6
585.0	1353.675	-3127.305	1480.046	20513.6	4613.6	-7383.4
590.0	1370.655	-3123.413	1473.890	20754.0	4848.4	-7578.9
595.0	1387.833	-3119.324	1467.571	20998.1	5090.8	-7779.7
600.0	1405.215	-3115.032	1461.085	21246.6	5341.0	-7986.1
605.0	1422.802	-3110.531	1454.426	21499.1	5599.7	-8198.3
610.0	1440.599	-3105.814	1447.590	21757.0	5865.8	-8416.6
615.0	1458.610	-3100.874	1440.572	22019.7	6140.9	-8640.6
620.0	1476.839	-3095.704	1433.367	22285.5	6427.6	-8872.2

S-IV GUIDANCE CUTOFF

624.151	1492.139	-3091.229	1427.238	22508.8	6675.4	-9070.8
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TABLE XVI
SPACE-FIXED EPHEMERIS POSITIONS AND VELOCITIES

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S
625.0	1495.284	-3090.294	1425.970	22506.6	6699.2	-9084.1
630.0	1513.781	-3084.734	1418.473	22451.0	6813.8	-9137.1
INSERTIØN						
634.151	1529.102	-3080.046	1412.216	22404.1	6908.8	-9180.9

TABLE XVII
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
FIRST MOTIØN						
-0.180	0.71	9.95	0.37	1.41	-8.92	4.28
LIFTØFF SIGNAL						
0.078	0.54	10.22	0.30	1.29	-9.11	4.51
1.0	0.11	10.98	0.10	0.98	-9.67	5.13
2.0	-0.17	11.56	-0.01	0.78	-10.12	5.57
3.0	-0.31	11.97	-0.06	0.69	-10.44	5.84
4.0	-0.37	12.26	-0.07	0.67	-10.69	6.00
5.0	-0.37	12.50	-0.07	0.70	-10.90	6.11
6.0	-0.34	12.71	-0.06	0.74	-11.09	6.19
7.0	-0.30	12.92	-0.05	0.80	-11.28	6.28
8.0	-0.25	13.14	-0.05	0.87	-11.47	6.37
9.0	-0.20	13.38	-0.05	0.95	-11.68	6.48
10.0	-0.15	13.64	-0.07	1.03	-11.90	6.61
11.0	-0.09	13.91	-0.10	1.12	-12.13	6.75
12.0	-0.01	14.21	-0.12	1.22	-12.37	6.89
13.0	0.08	14.51	-0.15	1.35	-12.62	7.04
14.0	0.19	14.81	-0.18	1.49	-12.88	7.18
15.0	0.32	15.11	-0.19	1.66	-13.13	7.31
16.0	0.49	15.40	-0.20	1.85	-13.38	7.41
17.0	0.69	15.68	-0.20	2.07	-13.63	7.50
18.0	0.91	15.95	-0.19	2.32	-13.88	7.57
19.0	1.16	16.21	-0.17	2.58	-14.13	7.62
20.0	1.43	16.47	-0.14	2.87	-14.37	7.66
21.0	1.72	16.73	-0.10	3.17	-14.62	7.69
22.0	2.02	17.00	-0.06	3.48	-14.88	7.71
23.0	2.32	17.28	-0.02	3.79	-15.16	7.74
24.0	2.63	17.58	0.02	4.11	-15.44	7.78
25.0	2.93	17.90	0.06	4.43	-15.75	7.83
26.0	3.24	18.24	0.09	4.75	-16.07	7.90
27.0	3.55	18.60	0.11	5.09	-16.40	7.98
28.0	3.89	18.97	0.14	5.46	-16.74	8.06
29.0	4.28	19.32	0.17	5.86	-17.07	8.11
30.0	4.99	19.48	0.26	6.55	-17.27	7.95

TABLE XVII
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
31.0	5.51	19.77	0.32	7.08	-17.56	7.92
32.0	5.97	20.05	0.40	7.54	-17.85	7.88
33.0	6.47	20.31	0.48	8.04	-18.13	7.82
34.0	7.00	20.59	0.54	8.57	-18.41	7.78
35.0	7.56	20.90	0.56	9.15	-18.70	7.79
36.0	8.07	21.20	0.50	9.69	-18.95	7.87
37.0	8.50	21.50	0.37	10.17	-19.15	8.02
38.0	8.87	21.80	0.26	10.57	-19.36	8.18
39.0	9.28	22.12	0.22	11.02	-19.63	8.27
40.0	9.87	22.43	0.30	11.61	-19.95	8.22
41.0	10.65	22.70	0.47	12.36	-20.28	8.02
42.0	11.54	22.90	0.67	13.21	-20.57	7.75
43.0	12.41	23.07	0.77	14.05	-20.79	7.54
44.0	13.14	23.25	0.71	14.80	-20.92	7.52
45.0	13.68	23.52	0.52	15.40	-21.07	7.68
46.0	14.11	23.61	0.30	15.88	-21.05	7.82
47.0	14.65	23.87	0.11	16.46	-21.20	7.98
48.0	15.23	24.23	-0.05	17.10	-21.44	8.15
49.0	15.82	24.60	-0.17	17.74	-21.71	8.29
50.0	16.35	24.90	-0.27	18.32	-21.93	8.40
51.0	16.80	25.06	-0.33	18.78	-22.04	8.43
52.0	17.08	24.99	-0.38	19.06	-21.97	8.37
53.0	17.31	24.63	-0.40	19.26	-21.64	8.17
54.0	17.60	24.11	-0.41	19.50	-21.19	7.86
MACH ONE						
54.006	17.60	24.11	-0.41	19.50	-21.19	7.86
55.0	17.94	23.67	-0.39	19.79	-20.81	7.56
56.0	18.33	23.34	-0.36	20.14	-20.54	7.28
57.0	19.23	23.17	-0.31	21.00	-20.43	6.96
58.0	20.27	23.21	-0.25	22.00	-20.51	6.69
59.0	21.34	23.50	-0.19	23.07	-20.82	6.53
60.0	22.41	24.09	-0.11	24.15	-21.38	6.50
61.0	23.44	24.50	-0.45	25.27	-21.59	6.75
62.0	24.63	24.90	-0.69	26.51	-21.84	6.88
63.0	25.79	25.34	-0.79	27.72	-22.19	6.91
64.0	26.73	25.88	-0.74	28.67	-22.70	6.91
65.0	27.44	26.52	-0.56	29.40	-23.35	6.90

TABLE XVII
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
66.0	28.15	27.16	-0.28	30.09	-24.06	6.81
MAXIMUM DYNAMIC PRESSURE						
67.000	28.97	27.78	0.10	30.88	-24.79	6.59
68.0	29.93	28.33	0.46	31.79	-25.46	6.34
69.0	30.95	28.88	0.75	32.78	-26.09	6.12
70.0	31.98	29.43	0.87	33.81	-26.64	6.05
71.0	33.03	30.00	0.75	34.93	-27.10	6.18
72.0	34.19	30.55	0.53	36.16	-27.48	6.37
73.0	35.35	31.15	0.42	37.37	-27.97	6.48
74.0	36.47	31.77	0.52	38.51	-28.57	6.44
75.0	37.49	32.42	0.73	39.53	-29.26	6.35
76.0	38.45	33.09	0.81	40.51	-29.89	6.38
77.0	39.40	33.78	0.62	41.55	-30.40	6.65
78.0	40.41	34.45	0.20	42.69	-30.79	7.09
79.0	41.49	35.11	-0.13	43.88	-31.22	7.44
80.0	42.60	35.77	-0.19	45.04	-31.78	7.56
81.0	43.76	36.39	-0.11	46.22	-32.37	7.52
82.0	44.96	36.99	0.04	47.42	-32.98	7.42
83.0	46.16	37.63	0.16	48.63	-33.61	7.34
84.0	47.39	38.26	0.22	49.89	-34.20	7.31
85.0	48.66	38.88	0.30	51.17	-34.79	7.25
86.0	49.94	39.48	0.33	52.47	-35.35	7.22
87.0	51.20	40.04	0.25	53.78	-35.81	7.27
88.0	52.45	40.58	0.17	55.08	-36.25	7.32
89.0	53.71	41.12	0.12	56.37	-36.71	7.33
90.0	54.96	41.70	0.15	57.64	-37.24	7.30
91.0	56.22	42.25	0.15	58.94	-37.73	7.27
92.0	57.53	42.78	0.17	60.26	-38.21	7.21
93.0	58.90	43.28	0.21	61.64	-38.68	7.10
94.0	60.31	43.75	0.30	63.05	-39.15	6.93
95.0	61.72	44.22	0.44	64.45	-39.63	6.71
96.0	63.10	44.71	0.59	65.82	-40.14	6.50
97.0	64.43	45.23	0.64	67.16	-40.63	6.41
98.0	65.69	45.78	0.59	68.47	-41.09	6.43
99.0	66.96	46.35	0.51	69.78	-41.56	6.48
100.0	68.28	46.90	0.45	71.14	-42.01	6.49
101.0	69.64	47.43	0.45	72.52	-42.49	6.44

TABLE XVII
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
102.0	71.03	47.99	0.49	73.93	-43.01	6.36
103.0	72.45	48.58	0.51	75.38	-43.53	6.30
104.0	73.87	49.16	0.53	76.82	-44.06	6.24
105.0	75.29	49.76	0.60	78.25	-44.62	6.14
106.0	76.71	50.35	0.71	79.69	-45.20	6.00
107.0	78.16	50.98	0.81	81.14	-45.80	5.89
108.0	79.62	51.63	0.83	82.63	-46.39	5.85
109.0	81.11	52.30	0.79	84.17	-46.96	5.87
110.0	82.64	52.99	0.73	85.75	-47.54	5.90
111.0	84.18	53.68	0.75	87.32	-48.16	5.86
112.0	85.74	54.37	0.84	88.90	-48.82	5.76
113.0	87.36	55.06	0.95	90.53	-49.47	5.63
114.0	89.02	55.75	1.02	92.21	-50.12	5.52
115.0	90.72	56.47	1.05	93.94	-50.77	5.46
116.0	92.45	57.25	1.05	95.71	-51.45	5.43
117.0	94.18	58.07	1.07	97.48	-52.19	5.41
118.0	95.90	58.91	1.12	99.24	-52.95	5.38
119.0	97.68	59.73	1.17	101.05	-53.70	5.33
120.0	99.51	60.58	1.22	102.93	-54.47	5.28
121.0	101.40	61.46	1.25	104.86	-55.26	5.24
122.0	103.33	62.39	1.27	106.83	-56.09	5.23
123.0	105.28	63.36	1.28	108.84	-56.94	5.24
124.0	107.27	64.36	1.29	110.89	-57.83	5.25
125.0	109.33	65.40	1.32	113.00	-58.76	5.26
126.0	111.47	66.48	1.35	115.19	-59.73	5.26
127.0	113.67	67.57	1.37	117.46	-60.70	5.27
128.0	115.92	68.67	1.37	119.76	-61.67	5.28
129.0	118.20	69.79	1.37	122.10	-62.66	5.30
130.0	120.53	70.99	1.37	124.51	-63.71	5.33
131.0	122.96	72.26	1.39	127.00	-64.84	5.37
132.0	125.45	73.60	1.43	129.57	-66.03	5.42
133.0	128.02	74.97	1.46	132.22	-67.25	5.46
134.0	130.68	76.37	1.49	134.95	-68.50	5.50
135.0	133.41	77.83	1.52	137.76	-69.80	5.55
136.0	136.31	79.25	1.55	140.74	-71.06	5.54
137.0	139.21	80.81	1.57	143.72	-72.45	5.61
138.0	142.08	82.53	1.60	146.70	-73.97	5.75
139.0	144.93	84.39	1.63	149.67	-75.62	5.97
140.0	147.77	86.40	1.66	152.64	-77.40	6.26
141.0	150.59	88.56	1.69	155.61	-79.30	6.62

TABLE XVII
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
INBOARD ENGINE CUTOFF						
142.000	153.39	90.86	1.72	158.58	-81.34	7.06
143.0	81.21	34.17	1.24	82.80	-30.57	-3.19
144.0	79.76	33.12	1.23	81.29	-29.61	-3.36
145.0	78.94	32.50	1.22	80.44	-29.04	-3.46
146.0	78.74	32.30	1.22	80.23	-28.84	-3.51
147.0	79.16	32.53	1.23	80.67	-29.03	-3.51
148.0	80.20	33.18	1.23	81.75	-29.60	-3.43
OUTBOARD ENGINE CUTOFF						
148.050	80.27	33.19	1.23	81.82	-29.61	-3.44
149.0	5.22	-25.77	0.69	3.00	23.15	-14.08
150.0	1.68	-28.42	0.66	-0.72	25.52	-14.51
155.0	16.26	-16.74	0.72	14.61	15.11	-12.30
160.0	16.15	-16.31	0.69	14.53	14.77	-12.04
165.0	16.48	-15.98	0.70	14.88	14.48	-11.97
GUIDANCE INITIATION						
166.690	16.53	-15.83	0.66	14.94	14.39	-11.88
170.0	16.21	-15.44	0.98	14.59	13.90	-11.89
175.0	15.16	-13.92	0.96	13.71	12.61	-10.91
180.0	15.36	-13.68	1.01	13.91	12.39	-10.88
185.0	15.86	-14.15	0.96	14.35	12.83	-11.18
190.0	16.16	-14.14	0.96	14.63	12.83	-11.24
195.0	16.49	-14.27	0.97	14.92	12.95	-11.39
200.0	16.82	-14.13	1.01	15.23	12.83	-11.43
205.0	17.04	-14.31	0.92	15.44	13.04	-11.49
210.0	17.33	-14.40	0.92	15.70	13.13	-11.61
215.0	17.55	-14.24	1.03	15.89	12.96	-11.67
220.0	17.98	-14.22	0.93	16.32	13.00	-11.67
225.0	18.32	-14.45	0.91	16.62	13.23	-11.84
230.0	18.56	-14.49	0.90	16.83	13.28	-11.91
235.0	18.92	-14.51	0.95	17.16	13.29	-12.04

TABLE XVII
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
240.0	19.12	-14.49	0.94	17.34	13.30	-12.07
245.0	19.41	-14.84	0.94	17.58	13.61	-12.30
250.0	19.69	-14.75	1.00	17.83	13.53	-12.37
255.0	20.01	-14.98	0.98	18.11	13.75	-12.53
260.0	20.29	-15.05	0.98	18.36	13.83	-12.64
265.0	20.63	-15.04	1.02	18.67	13.82	-12.73
270.0	21.06	-15.25	1.04	19.05	14.01	-12.96
275.0	21.41	-15.26	1.05	19.37	14.03	-13.05
280.0	21.73	-15.31	1.02	19.66	14.12	-13.12
285.0	21.97	-15.45	1.04	19.87	14.24	-13.26
290.0	22.22	-15.64	1.05	20.07	14.43	-13.41
295.0	22.72	-15.98	1.09	20.50	14.72	-13.73
300.0	23.02	-16.11	1.13	20.76	14.84	-13.88
305.0	23.43	-16.16	1.14	21.13	14.90	-14.02
310.0	23.80	-16.36	1.15	21.46	15.09	-14.20
315.0	24.19	-16.32	1.11	21.83	15.09	-14.24
320.0	24.63	-16.53	1.14	22.21	15.28	-14.46
325.0	25.08	-16.62	1.15	22.62	15.39	-14.62
330.0	25.44	-17.10	1.07	22.92	15.86	-14.86
335.0	25.87	-17.43	1.18	23.27	16.13	-15.21
340.0	26.29	-17.49	1.20	23.65	16.19	-15.35
345.0	26.65	-17.40	1.21	23.99	16.14	-15.39
350.0	27.05	-17.82	1.23	24.31	16.51	-15.70
355.0	27.34	-17.99	1.27	24.55	16.67	-15.88
360.0	27.75	-18.49	1.27	24.88	17.13	-16.22
365.0	28.15	-18.78	1.26	25.21	17.42	-16.44
370.0	28.64	-19.00	1.28	25.64	17.63	-16.68
375.0	29.06	-19.31	1.30	25.99	17.92	-16.93
380.0	29.52	-19.56	1.32	26.39	18.16	-17.18
385.0	30.00	-19.93	1.33	26.80	18.50	-17.47
390.0	30.54	-20.26	1.31	27.27	18.83	-17.73
395.0	31.10	-20.68	1.34	27.74	19.21	-18.09
400.0	31.49	-20.90	1.41	28.07	19.40	-18.34
405.0	31.89	-21.33	1.43	28.38	19.80	-18.66
410.0	32.39	-21.78	1.42	28.80	20.23	-18.97
415.0	32.80	-22.15	1.45	29.13	20.57	-19.27
420.0	33.30	-22.53	1.48	29.54	20.92	-19.59
425.0	33.78	-22.86	1.54	29.93	21.22	-19.90
430.0	34.33	-23.42	1.51	30.39	21.75	-20.27
435.0	34.96	-23.81	1.54	30.93	22.12	-20.63

TABLE XVII
EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
440.0	35.42	-24.27	1.54	31.30	22.55	-20.96
445.0	35.89	-24.82	1.56	31.67	23.06	-21.34
450.0	36.47	-25.33	1.46	32.16	23.60	-21.63
455.0	37.04	-25.88	1.60	32.60	24.04	-22.14
460.0	37.53	-26.39	1.61	33.00	24.52	-22.51
465.0	38.12	-26.89	1.63	33.48	24.99	-22.89
470.0	38.66	-27.65	1.67	33.88	25.67	-23.41
475.0	39.27	-28.24	1.68	34.38	26.22	-23.84
480.0	39.72	-28.91	1.66	34.71	26.86	-24.25
485.0	40.42	-29.24	1.73	35.31	27.15	-24.62
490.0	41.15	-30.19	1.74	35.87	28.02	-25.26
495.0	41.81	-30.83	1.77	36.41	28.62	-25.74
500.0	42.47	-31.56	1.77	36.93	29.30	-26.24
505.0	43.17	-32.37	1.70	37.49	30.08	-26.72
510.0	43.74	-33.17	1.81	37.90	30.78	-27.33
515.0	44.50	-33.95	1.84	38.50	31.49	-27.90
520.0	45.22	-34.71	1.88	39.07	32.18	-28.46
525.0	46.02	-35.68	1.89	39.69	33.07	-29.12
530.0	46.75	-36.51	1.92	40.26	33.83	-29.70
535.0	47.43	-37.63	1.92	40.75	34.86	-30.39
540.0	48.32	-38.39	1.97	41.48	35.55	-30.99
545.0	49.14	-39.48	1.98	42.10	36.55	-31.71
550.0	50.00	-40.69	2.04	42.73	37.63	-32.54
555.0	50.85	-41.90	2.05	43.37	38.74	-33.32
560.0	51.77	-42.93	2.19	44.07	39.63	-34.14
565.0	52.73	-44.12	2.07	44.84	40.79	-34.82
570.0	53.63	-45.43	2.13	45.49	41.96	-35.70
575.0	54.82	-46.63	2.13	46.46	43.08	-36.55
580.0	55.55	-48.53	2.13	46.88	44.79	-37.62
585.0	56.67	-50.04	2.16	47.72	46.16	-38.62
590.0	57.63	-51.74	2.23	48.38	47.68	-39.71
595.0	58.59	-53.43	2.22	49.05	49.22	-40.73
600.0	59.87	-55.10	2.28	50.02	50.72	-41.87
605.0	60.99	-57.10	2.29	50.80	52.53	-43.08
610.0	62.53	-58.53	2.28	52.05	53.86	-44.11
615.0	63.71	-60.82	2.20	52.87	55.96	-45.41
620.0	65.06	-63.50	2.22	53.78	58.37	-47.01

S-IV GUIDANCE CUTOFF

624.151	66.18	-65.73	2.24	54.53	60.37	-48.34
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TABLE XVII
 EARTH-FIXED PLUMBLINE AND SPACE-FIXED EPHEMERIS ACCELERATIONS

TIME SEC	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
625.0	-7.09	-23.56	1.15	-11.15	22.79	-10.62
630.0	-7.21	-23.52	1.14	-11.29	22.75	-10.56
INSERTION						
634.151	-7.32	-23.49	1.13	-11.40	22.72	-10.52

TABLE XVIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S
FIRST MOTIØN							
-0.180	3441.334	-80.56495	28.37067	28.53185	0.	90.000	0.
LIFTØFF SIGNAL							
0.078	3441.334	-80.56495	28.37067	28.53185	131.319	86.103	2.6
1.0	3441.335	-80.56495	28.37067	28.53185	132.613	87.719	12.4
2.0	3441.338	-80.56495	28.37067	28.53185	136.790	88.907	23.7
3.0	3441.343	-80.56495	28.37067	28.53185	158.316	89.666	35.5
4.0	3441.349	-80.56495	28.37067	28.53185	269.834	89.710	47.6
5.0	3441.358	-80.56495	28.37067	28.53185	288.947	89.413	60.0
6.0	3441.369	-80.56495	28.37067	28.53185	293.038	89.221	72.6
7.0	3441.382	-80.56496	28.37067	28.53185	294.710	89.111	85.4
8.0	3441.397	-80.56496	28.37067	28.53185	295.842	89.058	98.4
9.0	3441.415	-80.56497	28.37068	28.53185	297.057	89.043	111.7
10.0	3441.434	-80.56497	28.37068	28.53186	298.677	89.054	125.2
11.0	3441.456	-80.56498	28.37068	28.53186	300.924	89.084	139.0
12.0	3441.480	-80.56499	28.37068	28.53186	304.005	89.130	153.0
13.0	3441.506	-80.56499	28.37069	28.53186	308.185	89.188	167.4
14.0	3441.535	-80.56500	28.37069	28.53187	313.888	89.259	182.0
15.0	3441.566	-80.56500	28.37070	28.53187	321.865	89.339	197.0
16.0	3441.600	-80.56501	28.37070	28.53188	333.423	89.421	212.2
17.0	3441.636	-80.56501	28.37071	28.53189	350.400	89.488	227.8
18.0	3441.675	-80.56501	28.37071	28.53189	13.327	89.507	243.6
19.0	3441.716	-80.56501	28.37072	28.53190	37.557	89.446	259.7
20.0	3441.760	-80.56500	28.37073	28.53190	56.757	89.299	276.0
21.0	3441.807	-80.56499	28.37073	28.53191	69.852	89.087	292.6
22.0	3441.856	-80.56498	28.37073	28.53191	78.622	88.828	309.5
23.0	3441.909	-80.56495	28.37074	28.53191	84.682	88.535	326.7
24.0	3441.964	-80.56493	28.37074	28.53192	89.030	88.217	344.2
25.0	3442.022	-80.56489	28.37074	28.53192	92.252	87.880	362.0
26.0	3442.083	-80.56484	28.37074	28.53191	94.701	87.529	380.2
27.0	3442.147	-80.56479	28.37073	28.53191	96.602	87.165	398.7
28.0	3442.214	-80.56472	28.37072	28.53190	98.109	86.791	417.7
29.0	3442.284	-80.56465	28.37071	28.53189	99.325	86.407	437.1
30.0	3442.358	-80.56456	28.37070	28.53188	100.403	85.993	456.8

TABLE XVIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S
31.0	3442.434	-80.56445	28.37068	28.53186	101.386	85.545	476.8
32.0	3442.514	-80.56433	28.37066	28.53184	102.288	85.066	497.1
33.0	3442.597	-80.56420	28.37063	28.53181	103.094	84.576	517.8
34.0	3442.684	-80.56404	28.37060	28.53178	103.797	84.069	538.8
35.0	3442.774	-80.56386	28.37056	28.53174	104.387	83.550	560.2
36.0	3442.867	-80.56366	28.37051	28.53169	104.828	83.022	582.0
37.0	3442.964	-80.56344	28.37046	28.53164	105.111	82.490	604.2
38.0	3443.064	-80.56319	28.37040	28.53158	105.273	81.966	626.9
39.0	3443.168	-80.56292	28.37033	28.53151	105.359	81.445	649.9
40.0	3443.276	-80.56261	28.37026	28.53144	105.436	80.922	673.4
41.0	3443.387	-80.56228	28.37018	28.53136	105.564	80.383	697.4
42.0	3443.502	-80.56192	28.37009	28.53127	105.742	79.817	721.7
43.0	3443.621	-80.56152	28.36999	28.53117	105.945	79.227	746.5
44.0	3443.744	-80.56108	28.36988	28.53105	106.116	78.620	771.7
45.0	3443.870	-80.56061	28.36976	28.53093	106.241	78.020	797.6
46.0	3444.000	-80.56010	28.36963	28.53080	106.157	77.416	823.5
47.0	3444.135	-80.55954	28.36949	28.53066	106.084	76.812	849.9
48.0	3444.273	-80.55894	28.36933	28.53050	106.020	76.255	877.0
49.0	3444.415	-80.55830	28.36917	28.53034	106.044	75.652	904.6
50.0	3444.561	-80.55760	28.36899	28.53016	105.989	75.090	932.6
51.0	3444.712	-80.55686	28.36880	28.52998	105.937	74.505	960.9
52.0	3444.866	-80.55607	28.36861	28.52978	105.823	73.942	989.7
53.0	3445.025	-80.55523	28.36840	28.52957	105.659	73.424	1018.2
54.0	3445.187	-80.55433	28.36818	28.52935	105.452	72.877	1046.8
MACH ONE							
54.006	3445.188	-80.55433	28.36818	28.52935	105.451	72.874	1047.0
55.0	3445.354	-80.55338	28.36795	28.52912	105.268	72.366	1074.8
56.0	3445.524	-80.55238	28.36771	28.52887	105.268	71.822	1102.5
57.0	3445.698	-80.55132	28.36745	28.52862	105.268	71.237	1130.4
58.0	3445.876	-80.55020	28.36718	28.52835	105.317	70.655	1159.0
59.0	3446.058	-80.54902	28.36690	28.52806	105.315	70.049	1188.5
60.0	3446.244	-80.54777	28.36660	28.52776	105.313	69.472	1218.1
61.0	3446.434	-80.54646	28.36628	28.52744	105.251	68.866	1248.8
62.0	3446.628	-80.54507	28.36595	28.52711	105.164	68.264	1280.6
63.0	3446.825	-80.54361	28.36560	28.52676	105.066	67.652	1313.3
64.0	3447.027	-80.54208	28.36524	28.52639	104.972	67.037	1347.1
65.0	3447.234	-80.54046	28.36486	28.52601	104.898	66.431	1381.9

TABLE XVIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S
66.0	3447.445	-80.53876	28.36446	28.52562	104.857	65.838	1417.7
MAXIMUM DYNAMIC PRESSURE							
67.000	3447.660	-80.53697	28.36404	28.52520	104.851	65.255	1454.5
68.0	3447.879	-80.53510	28.36361	28.52476	104.878	64.683	1492.4
69.0	3448.104	-80.53314	28.36315	28.52430	104.929	64.115	1531.4
70.0	3448.333	-80.53109	28.36266	28.52381	104.993	63.552	1571.4
71.0	3448.567	-80.52894	28.36216	28.52330	105.050	62.992	1612.6
72.0	3448.806	-80.52670	28.36162	28.52277	105.091	62.433	1655.0
73.0	3449.050	-80.52435	28.36107	28.52221	105.119	61.880	1698.5
74.0	3449.299	-80.52190	28.36048	28.52162	105.146	61.331	1743.3
75.0	3449.554	-80.51934	28.35987	28.52101	105.178	60.789	1789.3
76.0	3449.813	-80.51666	28.35923	28.52037	105.213	60.259	1836.5
77.0	3450.079	-80.51388	28.35856	28.51970	105.240	59.740	1885.0
78.0	3450.350	-80.51097	28.35787	28.51900	105.250	59.233	1934.6
79.0	3450.626	-80.50795	28.35714	28.51827	105.244	58.737	1985.6
80.0	3450.908	-80.50480	28.35639	28.51751	105.225	58.248	2037.8
81.0	3451.197	-80.50152	28.35560	28.51673	105.205	57.768	2091.3
82.0	3451.491	-80.49812	28.35479	28.51591	105.192	57.295	2146.1
83.0	3451.791	-80.49458	28.35394	28.51506	105.187	56.827	2202.2
84.0	3452.098	-80.49090	28.35306	28.51418	105.188	56.367	2259.7
85.0	3452.410	-80.48708	28.35215	28.51326	105.191	55.913	2318.5
86.0	3452.730	-80.48312	28.35120	28.51231	105.195	55.465	2378.7
87.0	3453.056	-80.47900	28.35022	28.51132	105.199	55.023	2440.2
88.0	3453.388	-80.47474	28.34920	28.51030	105.200	54.587	2503.1
89.0	3453.727	-80.47032	28.34814	28.50924	105.197	54.157	2567.2
90.0	3454.073	-80.46574	28.34705	28.50814	105.196	53.734	2632.8
91.0	3454.426	-80.46100	28.34591	28.50700	105.194	53.317	2699.6
92.0	3454.786	-80.45609	28.34474	28.50582	105.192	52.906	2767.8
93.0	3455.153	-80.45100	28.34353	28.50460	105.192	52.501	2837.3
94.0	3455.527	-80.44575	28.34227	28.50334	105.195	52.099	2908.3
95.0	3455.909	-80.44031	28.34097	28.50204	105.201	51.702	2980.6
96.0	3456.297	-80.43470	28.33963	28.50069	105.211	51.309	3054.3
97.0	3456.693	-80.42889	28.33824	28.49929	105.222	50.921	3129.4
98.0	3457.097	-80.42290	28.33680	28.49785	105.234	50.541	3205.9
99.0	3457.508	-80.41671	28.33532	28.49637	105.243	50.169	3283.8
100.0	3457.927	-80.41033	28.33379	28.49483	105.251	49.804	3363.1
101.0	3458.353	-80.40374	28.33221	28.49325	105.259	49.446	3443.9

TABLE XVIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LONG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S
102.0	3458.787	-80.39695	28.33058	28.49161	105.266	49.093	3526.1
103.0	3459.230	-80.38995	28.32890	28.48993	105.271	48.746	3609.7
104.0	3459.681	-80.38273	28.32717	28.48818	105.278	48.404	3694.8
105.0	3460.140	-80.37530	28.32538	28.48639	105.286	48.068	3781.5
106.0	3460.607	-80.36764	28.32354	28.48454	105.296	47.738	3869.6
107.0	3461.083	-80.35975	28.32164	28.48263	105.307	47.414	3959.4
108.0	3461.567	-80.35164	28.31968	28.48067	105.318	47.096	4050.7
109.0	3462.059	-80.34329	28.31767	28.47865	105.329	46.784	4143.6
110.0	3462.561	-80.33471	28.31559	28.47657	105.339	46.478	4238.2
111.0	3463.071	-80.32588	28.31346	28.47443	105.349	46.178	4334.5
112.0	3463.590	-80.31680	28.31127	28.47223	105.359	45.883	4432.5
113.0	3464.119	-80.30748	28.30901	28.46996	105.370	45.593	4532.2
114.0	3464.656	-80.29789	28.30669	28.46763	105.382	45.308	4633.7
115.0	3465.203	-80.28805	28.30430	28.46524	105.395	45.028	4736.9
116.0	3465.760	-80.27794	28.30185	28.46278	105.408	44.753	4842.1
117.0	3466.325	-80.26756	28.29933	28.46025	105.420	44.482	4949.1
118.0	3466.901	-80.25690	28.29674	28.45765	105.433	44.217	5058.1
119.0	3467.487	-80.24597	28.29408	28.45498	105.446	43.957	5169.0
120.0	3468.082	-80.23475	28.29135	28.45224	105.459	43.702	5282.0
121.0	3468.688	-80.22324	28.28855	28.44942	105.472	43.451	5397.0
122.0	3469.304	-80.21143	28.28567	28.44654	105.486	43.205	5514.1
123.0	3469.931	-80.19932	28.28272	28.44357	105.499	42.964	5633.3
124.0	3470.568	-80.18691	28.27968	28.44053	105.511	42.727	5754.9
125.0	3471.216	-80.17418	28.27657	28.43740	105.524	42.495	5878.7
126.0	3471.876	-80.16114	28.27338	28.43420	105.537	42.268	6004.9
127.0	3472.546	-80.14777	28.27011	28.43091	105.549	42.044	6133.5
128.0	3473.228	-80.13408	28.26675	28.42754	105.562	41.825	6264.6
129.0	3473.921	-80.12004	28.26330	28.42409	105.574	41.610	6398.2
130.0	3474.627	-80.10567	28.25977	28.42054	105.586	41.399	6534.5
131.0	3475.344	-80.09095	28.25615	28.41691	105.597	41.192	6673.4
132.0	3476.073	-80.07587	28.25245	28.41319	105.609	40.989	6815.2
133.0	3476.816	-80.06043	28.24865	28.40937	105.621	40.791	6959.8
134.0	3477.570	-80.04461	28.24475	28.40546	105.632	40.596	7107.5
135.0	3478.338	-80.02843	28.24076	28.40146	105.644	40.406	7258.2
136.0	3479.119	-80.01185	28.23667	28.39735	105.656	40.216	7412.5
137.0	3479.914	-79.99489	28.23248	28.39315	105.667	40.033	7569.6
138.0	3480.722	-79.97752	28.22818	28.38883	105.679	39.855	7730.1
139.0	3481.545	-79.95975	28.22378	28.38442	105.693	39.682	7893.8
140.0	3482.382	-79.94156	28.21928	28.37990	105.705	39.516	8061.5
141.0	3483.233	-79.92295	28.21467	28.37527	105.717	39.355	8233.1

TABLE XVIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S
INBØARD ENGINE CUTØFF							
142.000	3484.100	-79.90391	28.20994	28.37053	105.732	39.205	8408.1
143.0	3484.981	-79.88448	28.20512	28.36568	105.746	39.062	8517.4
144.0	3485.867	-79.86482	28.20023	28.36078	105.760	38.925	8600.8
145.0	3486.759	-79.84494	28.19528	28.35581	105.774	38.790	8681.7
146.0	3487.658	-79.82485	28.19028	28.35079	105.788	38.658	8762.9
147.0	3488.562	-79.80454	28.18521	28.34571	105.802	38.528	8845.4
148.0	3489.471	-79.78401	28.18009	28.34056	105.817	38.403	8927.7
ØUTBØARD ENGINE CUTØFF							
148.050	3489.517	-79.78298	28.17983	28.34031	105.818	38.397	8931.7
149.0	3490.384	-79.76333	28.17492	28.33538	105.833	38.274	8935.7
150.0	3491.293	-79.74265	28.16975	28.33019	105.849	38.143	8920.1
155.0	3495.781	-79.63920	28.14380	28.30414	105.923	37.488	8890.7
160.0	3500.206	-79.53498	28.11752	28.27776	105.997	36.846	8906.7
165.0	3504.575	-79.42986	28.09088	28.25102	106.070	36.218	8926.4
GUIDANCE INITIATION							
166.690	3506.039	-79.39413	28.08180	28.24190	106.094	36.007	8933.8
170.0	3508.888	-79.32387	28.06388	28.22392	106.144	35.598	8948.9
175.0	3513.150	-79.21702	28.03651	28.19645	106.229	35.034	8973.0
180.0	3517.366	-79.10936	28.00877	28.16861	106.313	34.499	8998.3
185.0	3521.538	-79.00089	27.98066	28.14039	106.397	33.956	9026.2
190.0	3525.664	-78.89157	27.95218	28.11180	106.479	33.409	9056.4
195.0	3529.745	-78.78138	27.92330	28.08282	106.561	32.859	9089.2
200.0	3533.780	-78.67029	27.89404	28.05344	106.641	32.308	9124.3
205.0	3537.771	-78.55829	27.86437	28.02367	106.721	31.759	9161.4
210.0	3541.717	-78.44536	27.83430	27.99348	106.802	31.212	9201.2
215.0	3545.618	-78.33147	27.80381	27.96288	106.880	30.668	9243.1
220.0	3549.476	-78.21661	27.77289	27.93184	106.959	30.124	9288.0
225.0	3553.290	-78.10075	27.74155	27.90038	107.037	29.582	9334.9
230.0	3557.060	-77.98387	27.70977	27.86848	107.115	29.043	9384.4
235.0	3560.788	-77.86595	27.67754	27.83613	107.192	28.504	9436.3

TABLE XVIII
GEOGRAPHIC COORDINATES

TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S
240.0	3564.472	-77.74697	27.64486	27.80332	107.271	27.968	9490.7
245.0	3568.113	-77.62691	27.61171	27.77004	107.349	27.434	9547.1
250.0	3571.711	-77.50574	27.57808	27.73628	107.427	26.903	9606.1
255.0	3575.267	-77.38346	27.54397	27.70204	107.506	26.376	9667.4
260.0	3578.780	-77.26003	27.50937	27.66731	107.584	25.852	9731.2
265.0	3582.250	-77.13544	27.47426	27.63206	107.664	25.331	9797.4
270.0	3585.679	-77.00968	27.43864	27.59630	107.741	24.814	9866.0
275.0	3589.065	-76.88270	27.40249	27.56002	107.820	24.298	9937.3
280.0	3592.409	-76.75450	27.36581	27.52320	107.898	23.787	10011.0
285.0	3595.711	-76.62504	27.32859	27.48583	107.978	23.284	10087.4
290.0	3598.971	-76.49432	27.29081	27.44790	108.056	22.783	10166.2
295.0	3602.190	-76.36230	27.25246	27.40941	108.137	22.284	10247.8
300.0	3605.367	-76.22896	27.21353	27.37033	108.217	21.790	10332.1
305.0	3608.502	-76.09428	27.17401	27.33065	108.298	21.301	10419.2
310.0	3611.596	-75.95822	27.13389	27.29037	108.377	20.816	10509.1
315.0	3614.648	-75.82077	27.09315	27.24947	108.459	20.334	10601.7
320.0	3617.659	-75.68190	27.05177	27.20794	108.540	19.860	10697.3
325.0	3620.629	-75.54158	27.00976	27.16575	108.622	19.391	10795.5
330.0	3623.558	-75.39980	26.96708	27.12291	108.704	18.926	10896.6
335.0	3626.446	-75.25651	26.92374	27.07939	108.785	18.462	11000.8
340.0	3629.292	-75.11169	26.87971	27.03519	108.867	18.008	11107.6
345.0	3632.097	-74.96532	26.83498	26.99028	108.951	17.561	11217.4
350.0	3634.862	-74.81738	26.78953	26.94465	109.036	17.118	11330.1
355.0	3637.586	-74.66784	26.74335	26.89829	109.120	16.679	11445.6
360.0	3640.269	-74.51666	26.69643	26.85118	109.204	16.247	11564.4
365.0	3642.911	-74.36383	26.64875	26.80331	109.288	15.818	11685.6
370.0	3645.511	-74.20931	26.60029	26.75466	109.373	15.394	11810.3
375.0	3648.070	-74.05307	26.55104	26.70521	109.458	14.977	11937.8
380.0	3650.589	-73.89510	26.50099	26.65496	109.544	14.565	12068.5
385.0	3653.065	-73.73535	26.45011	26.60387	109.630	14.157	12202.3
390.0	3655.500	-73.57379	26.39838	26.55194	109.716	13.755	12339.3
395.0	3657.893	-73.41041	26.34580	26.49914	109.803	13.355	12479.5
400.0	3660.244	-73.24515	26.29233	26.44546	109.890	12.962	12623.0
405.0	3662.554	-73.07800	26.23797	26.39087	109.978	12.577	12769.8
410.0	3664.821	-72.90892	26.18269	26.33537	110.066	12.195	12919.9
415.0	3667.045	-72.73788	26.12648	26.27892	110.155	11.819	13073.4
420.0	3669.227	-72.56485	26.06931	26.22152	110.244	11.447	13230.3
425.0	3671.367	-72.38980	26.01116	26.16313	110.334	11.080	13390.9
430.0	3673.463	-72.21268	25.95202	26.10374	110.422	10.720	13554.9
435.0	3675.516	-72.03347	25.89186	26.04333	110.513	10.365	13722.5

TABLE XVIII
GEOGRAPHIC COORDINATES

TIME SEC	LC DIST NM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S
440.0	3677.527	-71.85212	25.83066	25.98188	110.604	10.015	13893.8
445.0	3679.493	-71.66861	25.76839	25.91935	110.696	9.668	14068.9
450.0	3681.415	-71.48290	25.70504	25.85573	110.788	9.327	14247.7
455.0	3683.293	-71.29495	25.64057	25.79100	110.880	8.991	14430.6
460.0	3685.126	-71.10471	25.57498	25.72513	110.973	8.660	14617.1
465.0	3686.915	-70.91216	25.50822	25.65808	111.067	8.333	14807.6
470.0	3688.658	-70.71726	25.44027	25.58985	111.161	8.011	15002.0
475.0	3690.356	-70.51996	25.37111	25.52040	111.257	7.694	15200.8
480.0	3692.008	-70.32022	25.30071	25.44970	111.352	7.382	15403.6
485.0	3693.613	-70.11801	25.22904	25.37773	111.449	7.074	15611.1
490.0	3695.172	-69.91327	25.15608	25.30445	111.546	6.772	15822.9
495.0	3696.684	-69.70596	25.08178	25.22984	111.643	6.474	16039.5
500.0	3698.148	-69.49604	25.00613	25.15386	111.741	6.179	16260.7
505.0	3699.565	-69.28345	24.92908	25.07648	111.840	5.889	16486.8
510.0	3700.932	-69.06815	24.85061	24.99767	111.938	5.605	16717.9
515.0	3702.251	-68.85008	24.77068	24.91739	112.040	5.322	16954.2
520.0	3703.520	-68.62920	24.68926	24.83561	112.140	5.045	17195.5
525.0	3704.740	-68.40546	24.60631	24.75230	112.242	4.773	17442.2
530.0	3705.909	-68.17879	24.52179	24.66740	112.344	4.505	17694.3
535.0	3707.027	-67.94914	24.43566	24.58090	112.447	4.240	17952.3
540.0	3708.093	-67.71645	24.34789	24.49274	112.550	3.980	18216.0
545.0	3709.107	-67.48067	24.25843	24.40288	112.655	3.722	18485.9
550.0	3710.068	-67.24172	24.16724	24.31129	112.760	3.469	18762.2
555.0	3710.976	-66.99955	24.07427	24.21790	112.865	3.219	19044.8
560.0	3711.828	-66.75408	23.97948	24.12268	112.972	2.973	19334.4
565.0	3712.625	-66.50525	23.88281	24.02558	113.079	2.730	19630.9
570.0	3713.366	-66.25297	23.78423	23.92655	113.186	2.489	19934.7
575.0	3714.050	-65.99718	23.68367	23.82554	113.295	2.252	20246.2
580.0	3714.675	-65.73779	23.58108	23.72248	113.404	2.017	20565.5
585.0	3715.240	-65.47472	23.47641	23.61733	113.515	1.781	20892.7
590.0	3715.744	-65.20789	23.36959	23.51002	113.626	1.549	21227.9
595.0	3716.184	-64.93721	23.26057	23.40050	113.737	1.318	21571.9
600.0	3716.560	-64.66260	23.14928	23.28870	113.850	1.090	21925.2
605.0	3716.870	-64.38394	23.03566	23.17455	113.963	0.862	22288.0
610.0	3717.112	-64.10115	22.91962	23.05797	114.079	0.640	22661.6
615.0	3717.286	-63.81410	22.80110	22.93889	114.193	0.420	23045.6
620.0	3717.389	-63.52269	22.68002	22.81724	114.309	0.195	23440.0

S-IV GUIDANCE CUTOFF

624.151	3717.416	-63.27736	22.57751	22.71424	114.406	0.003	23776.4
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TABLE XVIII
 GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S
625.0	3717.416	-63.22685	22.55634	22.69297	114.428	-0.002	23785.5
630.0	3717.416	-62.92972	22.43127	22.56731	114.558	0.004	23785.9
INSERTIØN							
634.151	3717.417	-62.68349	22.32697	22.46252	114.666	0.009	23786.0

TABLE XIX
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL FT/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES LB/FT SQ	RANGE NM	ALTITUDE FT
FIRST MOTION							
-0.180	1341.6	0.	90.000	0.013	0.251	-0.	105
LIFTOFF SIGNAL							
0.078	1341.8	0.111	90.005	0.013	0.265	0.000	106
1.0	1342.1	0.529	90.014	0.017	0.448	0.000	112
2.0	1342.2	1.011	90.014	0.025	0.923	0.000	130
3.0	1342.2	1.514	90.008	0.034	1.727	0.000	159
4.0	1342.2	2.032	90.000	0.044	2.887	0.000	200
5.0	1342.4	2.560	89.991	0.055	4.419	0.000	254
6.0	1342.7	3.098	89.983	0.066	6.337	-0.000	321
7.0	1343.2	3.645	89.976	0.077	8.655	-0.000	400
8.0	1343.8	4.200	89.970	0.088	11.386	-0.000	491
9.0	1344.7	4.764	89.964	0.100	14.548	-0.001	596
10.0	1345.7	5.337	89.958	0.112	18.159	-0.001	714
11.0	1347.0	5.921	89.951	0.124	22.224	-0.002	846
12.0	1348.5	6.515	89.944	0.136	26.704	-0.002	992
13.0	1350.3	7.120	89.937	0.149	31.689	-0.002	1152
14.0	1352.3	7.735	89.930	0.162	37.199	-0.003	1327
15.0	1354.7	8.360	89.924	0.175	43.247	-0.003	1516
16.0	1357.5	8.994	89.918	0.188	49.819	-0.003	1721
17.0	1360.6	9.636	89.914	0.202	56.903	-0.004	1940
18.0	1364.2	10.285	89.913	0.216	64.539	-0.004	2176
19.0	1368.2	10.940	89.915	0.231	72.728	-0.004	2428
20.0	1372.7	11.599	89.921	0.245	81.458	-0.004	2696
21.0	1377.6	12.262	89.932	0.260	90.734	-0.004	2979
22.0	1383.1	12.929	89.947	0.275	100.547	-0.004	3281
23.0	1389.1	13.598	89.967	0.291	110.899	-0.004	3598
24.0	1395.7	14.270	89.992	0.306	121.812	0.004	3934
25.0	1402.7	14.945	90.022	0.323	133.375	0.005	4286
26.0	1410.4	15.623	90.057	0.339	145.602	0.007	4657
27.0	1418.6	16.304	90.095	0.356	158.317	0.009	5046
28.0	1427.4	16.988	90.138	0.373	171.341	0.012	5454
29.0	1436.9	17.673	90.186	0.391	184.956	0.016	5880
30.0	1447.1	18.354	90.240	0.409	199.232	0.021	6326

TABLE XIX
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL FT/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES LB/FT SQ	RANGE NM	ALTITUDE FT
31.0	1458.1	19.028	90.304	0.428	214.081	0.026	6791
32.0	1469.9	19.691	90.377	0.447	229.483	0.033	7277
33.0	1482.3	20.348	90.457	0.466	245.155	0.040	7782
34.0	1495.6	20.997	90.545	0.486	261.174	0.048	8308
35.0	1509.6	21.638	90.638	0.506	277.776	0.058	8854
36.0	1524.4	22.270	90.735	0.526	294.623	0.069	9421
37.0	1540.0	22.893	90.831	0.548	311.871	0.081	10010
38.0	1556.2	23.508	90.927	0.569	329.879	0.095	10620
39.0	1573.1	24.115	91.022	0.592	348.030	0.110	11251
40.0	1590.8	24.710	91.121	0.615	366.146	0.126	11905
41.0	1609.3	25.293	91.231	0.637	383.888	0.144	12581
42.0	1628.8	25.857	91.353	0.660	400.976	0.164	13280
43.0	1649.2	26.402	91.487	0.683	417.802	0.186	14001
44.0	1670.6	26.928	91.626	0.707	435.110	0.210	14746
45.0	1692.8	27.446	91.766	0.731	451.789	0.236	15514
46.0	1715.7	27.932	91.887	0.757	469.923	0.264	16306
47.0	1739.4	28.406	92.012	0.783	488.002	0.295	17122
48.0	1763.6	28.886	92.134	0.812	507.161	0.328	17961
49.0	1788.9	29.334	92.277	0.840	525.774	0.363	18825
50.0	1814.6	29.777	92.405	0.870	543.877	0.401	19714
51.0	1841.2	30.194	92.539	0.901	562.680	0.442	20627
52.0	1868.4	30.601	92.660	0.933	581.673	0.486	21565
53.0	1895.3	30.992	92.766	0.967	600.437	0.532	22529
54.0	1923.0	31.348	92.866	1.000	616.563	0.581	23516
MACH ONE							
54.006	1923.2	31.350	92.867	1.000	616.641	0.581	23523
55.0	1950.2	31.682	92.961	1.032	630.322	0.633	24528
56.0	1977.7	31.980	93.095	1.062	639.033	0.688	25563
57.0	2006.2	32.243	93.235	1.091	645.757	0.746	26622
58.0	2035.5	32.497	93.387	1.124	654.054	0.807	27703
59.0	2066.0	32.732	93.533	1.159	664.155	0.872	28808
60.0	2096.7	32.961	93.677	1.192	669.189	0.941	29936
61.0	2128.9	33.170	93.811	1.227	674.193	1.013	31089
62.0	2162.4	33.375	93.939	1.265	679.645	1.088	32266
63.0	2197.0	33.565	94.066	1.304	684.724	1.168	33468
64.0	2232.8	33.746	94.194	1.346	690.039	1.252	34695
65.0	2269.6	33.922	94.326	1.389	693.258	1.341	35949

TABLE XIX
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL FT/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES LB/FT SQ	RANGE NM	ALTITUDE FT
66.0	2307.4	34.095	94.466	1.440	701.448	1.434	37228
	MAXIMUM DYNAMIC PRESSURE						
67.000	2346.2	34.266	94.616	1.487	704.056	1.531	38535
68.0	2385.9	34.432	94.777	1.534	702.336	1.634	39870
69.0	2426.8	34.592	94.946	1.581	698.320	1.741	41233
70.0	2468.8	34.743	95.121	1.634	696.697	1.853	42625
71.0	2512.0	34.887	95.295	1.684	690.083	1.971	44047
72.0	2556.5	35.020	95.465	1.734	680.070	2.094	45498
73.0	2602.3	35.145	95.631	1.787	670.935	2.222	46981
74.0	2649.4	35.263	95.797	1.840	658.223	2.356	48494
75.0	2697.7	35.375	95.966	1.896	645.928	2.497	50039
76.0	2747.2	35.482	96.135	1.951	631.302	2.643	51617
77.0	2797.9	35.585	96.300	2.003	612.760	2.796	53228
78.0	2849.9	35.684	96.457	2.059	595.261	2.955	54873
79.0	2903.1	35.777	96.606	2.106	571.658	3.121	56552
80.0	2957.6	35.865	96.747	2.162	551.875	3.293	58267
81.0	3013.5	35.946	96.887	2.217	531.727	3.472	60017
82.0	3070.7	36.022	97.028	2.268	508.562	3.659	61804
83.0	3129.1	36.091	97.171	2.317	484.938	3.853	63628
84.0	3189.0	36.155	97.316	2.376	464.449	4.054	65490
85.0	3250.2	36.212	97.460	2.424	440.429	4.264	67389
86.0	3312.8	36.263	97.604	2.481	420.136	4.481	69329
87.0	3376.8	36.307	97.745	2.531	397.219	4.706	71308
88.0	3442.2	36.345	97.884	2.588	378.034	4.939	73327
89.0	3508.9	36.376	98.018	2.653	360.394	5.182	75387
90.0	3576.9	36.403	98.152	2.720	342.672	5.432	77488
91.0	3646.3	36.423	98.283	2.789	325.319	5.692	79631
92.0	3717.0	36.438	98.412	2.821	300.835	5.961	81816
93.0	3789.2	36.446	98.540	2.881	283.712	6.240	84045
94.0	3862.7	36.449	98.668	2.940	265.715	6.527	86317
95.0	3937.6	36.445	98.796	3.008	250.771	6.825	88632
96.0	4014.0	36.435	98.924	3.092	238.093	7.133	90993
97.0	4091.7	36.420	99.051	3.168	224.160	7.451	93399
98.0	4170.8	36.402	99.176	3.248	210.811	7.779	95850
99.0	4251.4	36.382	99.298	3.288	192.038	8.118	98345
100.0	4333.3	36.358	99.417	3.344	178.196	8.468	100887
101.0	4416.6	36.331	99.533	3.431	167.584	8.829	103477

TABLE XIX
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL FT/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES LB/FT SQ	RANGE NM	ALTITUDE FT
102.0	4501.4	36.301	99.647	3.493	155.005	9.201	106115
103.0	4587.6	36.266	99.758	3.572	143.698	9.585	108803
104.0	4675.3	36.229	99.868	3.640	131.807	9.980	111540
105.0	4764.4	36.189	99.977	3.711	122.430	10.388	114327
106.0	4855.1	36.147	100.085	3.803	113.865	10.808	117163
107.0	4947.4	36.102	100.192	3.871	104.419	11.240	120051
108.0	5041.1	36.056	100.297	3.928	95.102	11.684	122991
109.0	5136.5	36.008	100.400	3.981	86.527	12.142	125983
110.0	5233.5	35.959	100.501	4.063	79.751	12.613	129027
111.0	5332.2	35.909	100.600	4.159	73.841	13.097	132125
112.0	5432.5	35.857	100.697	4.187	65.979	13.595	135278
113.0	5534.5	35.803	100.793	4.257	60.114	14.106	138486
114.0	5638.3	35.748	100.889	4.338	54.975	14.632	141750
115.0	5743.9	35.692	100.983	4.398	49.703	15.172	145071
116.0	5851.3	35.635	101.076	4.500	45.725	15.726	148449
117.0	5960.6	35.576	101.167	4.604	41.968	16.296	151885
118.0	6071.8	35.517	101.256	4.708	38.365	16.880	155380
119.0	6184.9	35.458	101.345	4.804	34.863	17.480	158935
120.0	6300.0	35.398	101.432	4.933	31.992	18.096	162552
121.0	6417.1	35.338	101.518	5.064	29.229	18.727	166229
122.0	6536.3	35.278	101.602	5.162	26.257	19.375	169970
123.0	6657.7	35.217	101.685	5.288	23.768	20.040	173775
124.0	6781.2	35.156	101.766	5.390	21.239	20.721	177644
125.0	6907.1	35.096	101.846	5.488	19.108	21.420	181579
126.0	7035.2	35.036	101.925	5.657	17.850	22.136	185581
127.0	7165.8	34.976	102.002	5.832	16.327	22.870	189651
128.0	7298.8	34.915	102.078	6.015	14.496	23.622	193790
129.0	7434.4	34.855	102.153	6.203	12.536	24.392	198000
130.0	7572.5	34.795	102.227	6.386	11.079	25.182	202282
131.0	7713.3	34.736	102.299	6.577	9.765	25.991	206637
132.0	7856.9	34.677	102.370	6.775	8.586	26.819	211066
133.0	8003.4	34.619	102.440	6.981	7.501	27.667	215571
134.0	8152.8	34.562	102.509	7.196	6.494	28.536	220154
135.0	8305.2	34.505	102.578	7.419	5.583	29.425	224815
136.0	8461.3	34.447	102.645	7.651	4.765	30.336	229557
137.0	8620.1	34.392	102.711	7.891	4.035	31.268	234381
138.0	8782.2	34.338	102.776	8.140	3.388	32.223	239288
139.0	8947.5	34.286	102.843	8.398	2.820	33.200	244281
140.0	9116.8	34.239	102.906	8.667	2.326	34.200	249361
141.0	9289.9	34.194	102.969	8.948	1.901	35.223	254532

TABLE XIX
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL FT/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES LB/FT SQ	RANGE NM	ALTITUDE FT
INBOARD ENGINE CUTOFF							
142.000	9466.2	34.155	103.033	9.241	1.538	36.270	259795
143.0	9577.1	34.086	103.077	9.473	1.214	37.338	265139
144.0	9662.1	34.006	103.114	9.686	0.945	38.420	270520
145.0	9744.7	33.927	103.150	9.821	0.718	39.513	275936
146.0	9827.5	33.848	103.186	9.913	0.539	40.618	281389
147.0	9911.6	33.772	103.221	10.006	0.404	41.736	286877
148.0	9995.4	33.699	103.257	10.099	0.302	42.865	292400
OUTBOARD ENGINE CUTOFF							
148.050	9999.5	33.696	103.258	10.104	0.297	42.922	292676
149.0	10005.3	33.587	103.275	10.041	0.219	44.003	297940
150.0	9991.7	33.462	103.288	9.888	0.157	45.141	303458
155.0	9972.0	32.861	103.359	9.227	0.035	50.837	330699
160.0	9997.2	32.293	103.441	8.471	0.009	56.579	357558
165.0	10025.8	31.740	103.521	7.456	0.003	62.373	384080
GUIDANCE INITIATION							
166.690	10036.2	31.555	103.548	7.175	0.002	64.343	392965
170.0	10057.0	31.195	103.603	6.333	0.001	68.219	410260
175.0	10089.0	30.701	103.692	5.482	0.001	74.117	436128
180.0	10121.6	30.234	103.780	4.914	0.000	80.064	461718
185.0	10157.0	29.760	103.868	4.501	0.000	86.059	487035
190.0	10194.6	29.284	103.956	4.246	0.000	92.105	512077
195.0	10234.6	28.806	104.043	4.081	0.000	98.204	536843
200.0	10277.0	28.328	104.130	3.975	0.000	104.357	561334
205.0	10321.3	27.852	104.217	3.909	0.000	110.564	585550
210.0	10368.0	27.380	104.304	3.849	0.000	116.828	609496
215.0	10416.8	26.910	104.390	3.803	0.000	123.149	633171
220.0	10468.4	26.441	104.477	3.772	0.000	129.528	656579
225.0	10522.0	25.975	104.563	3.745	0.000	135.968	679722
230.0	10578.0	25.511	104.650	3.720	0.000	142.469	702600
235.0	10636.3	25.048	104.736	3.697	0.000	149.032	725215

TABLE XIX
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL FT/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES LB/FT SQ	RANGE NM	ALTITUDE FT
240.0	10697.0	24.588	104.823	3.677	0.000	155.659	747567
245.0	10759.7	24.130	104.911	3.665	0.000	162.351	769658
250.0	10824.7	23.675	104.998	3.656	0.000	169.110	791488
255.0	10892.0	23.223	105.086	3.650	0.000	175.936	813057
260.0	10961.6	22.775	105.175	3.645	0.000	182.831	834368
265.0	11033.4	22.328	105.264	3.641	0.000	189.796	855421
270.0	11107.6	21.886	105.352	3.639	0.000	196.832	876215
275.0	11184.3	21.445	105.442	3.639	0.000	203.941	896753
280.0	11263.4	21.008	105.530	3.640	0.000	211.125	917033
285.0	11344.9	20.577	105.621	3.642	0.000	218.385	937059
290.0	11428.8	20.149	105.710	3.646	0.000	225.721	956832
295.0	11515.3	19.722	105.801	3.651	0.000	233.136	976351
300.0	11604.4	19.299	105.893	3.660	0.000	240.631	995616
305.0	11696.2	18.881	105.986	3.672	0.000	248.208	1014627
310.0	11790.7	18.466	106.076	3.685	0.000	255.868	1033386
315.0	11887.8	18.054	106.169	3.699	0.000	263.614	1051892
320.0	11987.7	17.647	106.263	3.715	0.000	271.446	1070146
325.0	12090.1	17.245	106.357	3.731	0.000	279.366	1088150
330.0	12195.2	16.846	106.451	3.749	0.000	287.376	1105905
335.0	12303.4	16.448	106.544	3.768	0.000	295.478	1123407
340.0	12414.2	16.058	106.639	3.788	0.000	303.673	1140658
345.0	12527.7	15.674	106.735	3.809	0.000	311.964	1157659
350.0	12644.0	15.293	106.833	3.831	0.000	320.352	1174413
355.0	12763.0	14.915	106.929	3.854	0.000	328.838	1190917
360.0	12885.2	14.542	107.026	3.879	0.000	337.424	1207172
365.0	13009.7	14.172	107.123	3.904	0.000	346.113	1223177
370.0	13137.6	13.806	107.221	3.931	0.000	354.905	1238931
375.0	13268.3	13.445	107.319	3.959	0.000	363.804	1254432
380.0	13401.9	13.088	107.418	3.987	0.000	372.811	1269684
385.0	13538.6	12.735	107.517	4.017	0.000	381.928	1284683
390.0	13678.5	12.385	107.617	4.048	0.000	391.157	1299427
395.0	13821.4	12.038	107.717	4.081	0.000	400.499	1313917
400.0	13967.5	11.696	107.818	4.117	0.000	409.958	1328150
405.0	14116.9	11.360	107.919	4.154	0.000	419.536	1342128
410.0	14269.4	11.027	108.021	4.193	0.000	429.234	1355849
415.0	14425.3	10.697	108.123	4.232	0.000	439.054	1369312
420.0	14584.5	10.372	108.226	4.273	0.000	448.999	1382515
425.0	14747.2	10.050	108.329	4.315	0.000	459.072	1395457
430.0	14913.4	9.733	108.431	4.358	0.000	469.274	1408138
435.0	15083.1	9.421	108.536	4.402	0.000	479.608	1420556

TABLE XIX
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL FT/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES LB/FT SQ	RANGE NM	ALTITUDE FT
440.0	15256.3	9.113	108.641	4.448	0.000	490.077	1432711
445.0	15433.2	8.806	108.746	4.494	0.000	500.683	1444597
450.0	15613.9	8.504	108.852	4.542	0.000	511.428	1456217
455.0	15798.5	8.207	108.958	4.591	0.000	522.315	1467566
460.0	15986.7	7.913	109.065	4.642	0.000	533.347	1478643
465.0	16178.8	7.623	109.173	4.693	0.000	544.527	1489447
470.0	16374.8	7.336	109.281	4.747	0.000	555.857	1499975
475.0	16575.0	7.053	109.391	4.801	0.000	567.340	1510225
480.0	16779.2	6.774	109.500	4.857	0.000	578.980	1520194
485.0	16988.0	6.499	109.611	4.914	0.000	590.778	1529881
490.0	17201.0	6.227	109.722	4.973	0.000	602.739	1539284
495.0	17418.8	5.959	109.833	5.033	0.000	614.865	1548400
500.0	17641.2	5.694	109.946	5.095	0.000	627.160	1557225
505.0	17868.4	5.433	110.058	5.158	0.000	639.628	1565758
510.0	18100.6	5.175	110.171	5.223	0.000	652.271	1573996
515.0	18337.8	4.919	110.287	5.290	0.000	665.094	1581934
520.0	18580.1	4.668	110.402	5.359	0.000	678.100	1589570
525.0	18827.6	4.421	110.517	5.429	0.000	691.294	1596902
530.0	19080.6	4.177	110.634	5.501	0.000	704.678	1603927
535.0	19339.3	3.936	110.751	5.575	0.000	718.258	1610641
540.0	19603.7	3.698	110.869	5.651	0.000	732.037	1617039
545.0	19874.2	3.462	110.988	5.729	0.000	746.019	1623118
550.0	20151.2	3.229	111.107	5.809	0.000	760.211	1628873
555.0	20434.4	3.000	111.227	5.891	0.000	774.615	1634301
560.0	20724.5	2.773	111.349	5.976	0.000	789.238	1639394
565.0	21021.4	2.549	111.470	6.064	0.000	804.084	1644151
570.0	21325.7	2.326	111.592	6.155	0.000	819.158	1648563
575.0	21637.6	2.107	111.716	6.249	0.000	834.467	1652625
580.0	21957.2	1.889	111.840	6.345	0.000	850.017	1656333
585.0	22284.7	1.670	111.965	6.443	0.000	865.812	1659672
590.0	22620.2	1.454	112.091	6.545	0.000	881.860	1662636
595.0	22964.4	1.239	112.218	6.649	0.000	898.166	1665215
600.0	23317.8	1.025	112.345	6.756	0.000	914.737	1667401
605.0	23680.8	0.812	112.474	6.867	0.000	931.581	1669182
610.0	24054.4	0.603	112.604	6.981	0.000	948.706	1670551
615.0	24438.5	0.396	112.734	7.098	0.000	966.118	1671502
620.0	24832.9	0.184	112.865	7.219	0.000	983.827	1672020
S-IV GUIDANCE CUTOFF							
624.151	25169.2	0.003	112.975	7.323	0.000	998.760	1672099

TABLE XIX
SPECIAL TRAJECTORY DEPENDENT PARAMETERS

TIME SEC	SF VEL FT/S	FLT-PATH DEG	HEAD DEG	MACH	DYN-PRES LB/FT SQ	RANGE NM	ALTITUDE FT
625.0	25178.3	-0.001	112.996	7.326	0.000	1001.838	1672079
630.0	25178.6	0.004	113.118	7.326	0.000	1019.961	1671969
INSERTION							
634.151	25178.7	0.008	113.219	7.326	0.000	1035.007	1671888

APPENDIX
DEFINITIONS OF SYMBOLS

<u>Symbol</u>	<u>Definitions</u>
XE, YE, ZE DXE, DYE, DZE DDXE, DDYE, DDZE	Position, velocity and acceleration components in the <u>Earth-Fixed Cartesian Coordinate System</u> . The origin of this system is the projection of the center of gravity of the complete vehicle at first motion onto the Fischer Ellipsoid of 1960. The X-Z plane is tangent to the reference ellipsoid at the origin of the coordinate system. The positive X-axis is oriented in the flight azimuth direction, 105 deg E of N. The Y-axis is normal to the X-Z plane and is positive above the origin. The Z-axis is normal to the X-Y plane and is in a right hand relation to the X-Y axes with the positive direction 195 deg E of N. The origin of this earth-fixed system rotates with an angular velocity identical to that of the earth. The earth-fixed coordinate system is shown in Figure 18.
XSP, YSP, ZSP DXSP, DYSP, DZSP DDXSP, DDYSP, DDZSP	Position, velocity and acceleration components in the <u>Space-Fixed Ephemeris Coordinate System</u> . The origin of this system is located at the geocentric center of the earth. The Z-axis points north along the earth's axis of rotation (through the north pole). The X-Y plane is coincident with the equatorial plane. The X-axis points through the vernal equinox. The reference equinox and equator are the mean equinox and equator of date for the epoch of midnight or zero hours on the day of launch. The Y-axis is normal to the X-Z plane and in a right hand relation to the X-, Z-axes. The direction of the coordinate axes remain fixed in space although the origin continues to move with the center of the earth. The space-fixed ephemeris coordinate system is shown in Figure 18.

DEFINITIONS OF SYMBOLS (CONT'D)

<u>Symbol</u>	<u>Definition</u>
E. C. DIST	<p>Position of vehicle in the <u>Geographic Coordinate System</u>. Position in this system is defined by the radius vector from the vehicle to the geocentric center of the earth (E. C. DIST), geocentric latitude (G. C. LAT) and longitude (LONG). A subvehicle point is defined as the intersection of the reference ellipsoid and the radius vector from the vehicle to the center of the earth. The geocentric latitude and longitude refer to the subvehicle point. Geocentric latitude is the angle between the radius vector and the equatorial plane, positive north of the equator. Longitude is the angle between the projection of the radius vector into the equatorial plane and the Greenwich meridian, measured positive east of the Greenwich meridian.</p>
LONG	
G. C. LAT	
E. F. VEL	<p>Earth-fixed velocity of vehicle in the <u>Geographic Coordinate System</u>. Velocity in this system is given in terms of azimuth (VEL-AZ), elevation (VEL - ELEV), and magnitude of the velocity vector (E. F. VEL). Azimuth is the angle between the projection of the velocity vector into the local horizontal plane and the north direction in this plane. Elevation is the angle between the velocity vector and the local horizontal plane. The local horizontal plane is defined as the plane perpendicular to the radius vector from the vehicle to the geocentric center of the earth. The geographic coordinate system is shown in Figure 18.</p>
VEL-AZ	
VEL-ELEV	

DEFINITIONS OF SYMBOLS (CONT'D)

<u>Symbol</u>	<u>Definition</u>
S. F. VEL	Space-fixed velocity of vehicle in the <u>Geographic Coordinate System</u> . Velocity is given in terms of flight-path angle (FLT-PATH), heading angle (HEAD), and magnitude of the velocity vector (S. F. VEL). The flight-path angle is the angle between the space-fixed velocity vector and the plane normal to the radius vector from the vehicle to the geocentric center of the earth, measured positive upward from this plane. The heading angle is measured positive clockwise from north to the projection of the space-fixed velocity vector in the plane normal to the radius vector.
FLT-PATH	
HEAD	
LAT	Geodetic latitude of vehicle
MACH	Mach number
DYN PRES	Dynamic Pressure
ALTITUDE	Distance from the subvehicle point to the center of gravity of the vehicle measured along the radius vector from the vehicle to the geocentric center of the earth.
RANGE	Surface range measured along a spherical earth from the launch site to the subvehicle point.
Mean Sidereal Time (θ)	The <u>mean sidereal time</u> is the angle between the <u>mean vernal equinox</u> and the Greenwich meridian for the epoch of midnight on the day of launch.
Orbital Element	The <u>Orbital Element System</u> is defined by six osculating elements of the two body ellipse with the reference body being determined by the body constants used, normally those of the earth. The elements are the semi-major axis of

DEFINITIONS OF SYMBOLS (CONT'D)

<u>Symbol</u>	<u>Definition</u>
Orbital Element	the ellipse; the eccentricity; the right ascension of the ascending node (Point of intersection of the orbital plane and earth equatorial plane); the inclination of the orbital plane to the earth equatorial plane; the argument of perigee or the angle between the ascending node and the perigee; the true anomaly or the angle between the perigee point and the satellite point. The various orbital elements are shown in Figure 18.

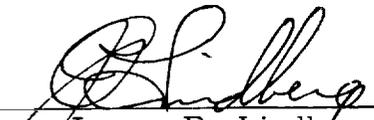
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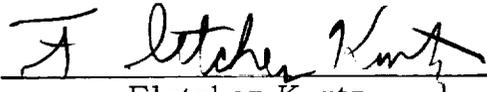
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By Jonathan B. Haussler and Robert H. Benson

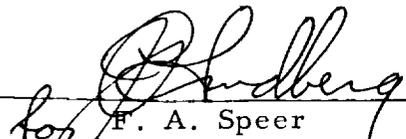
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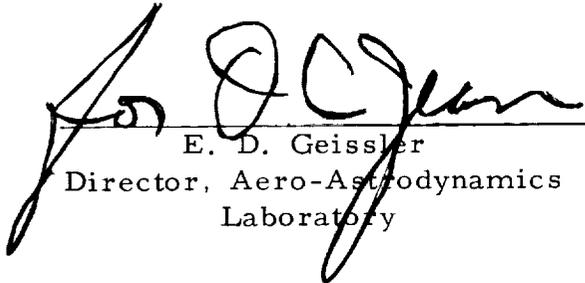
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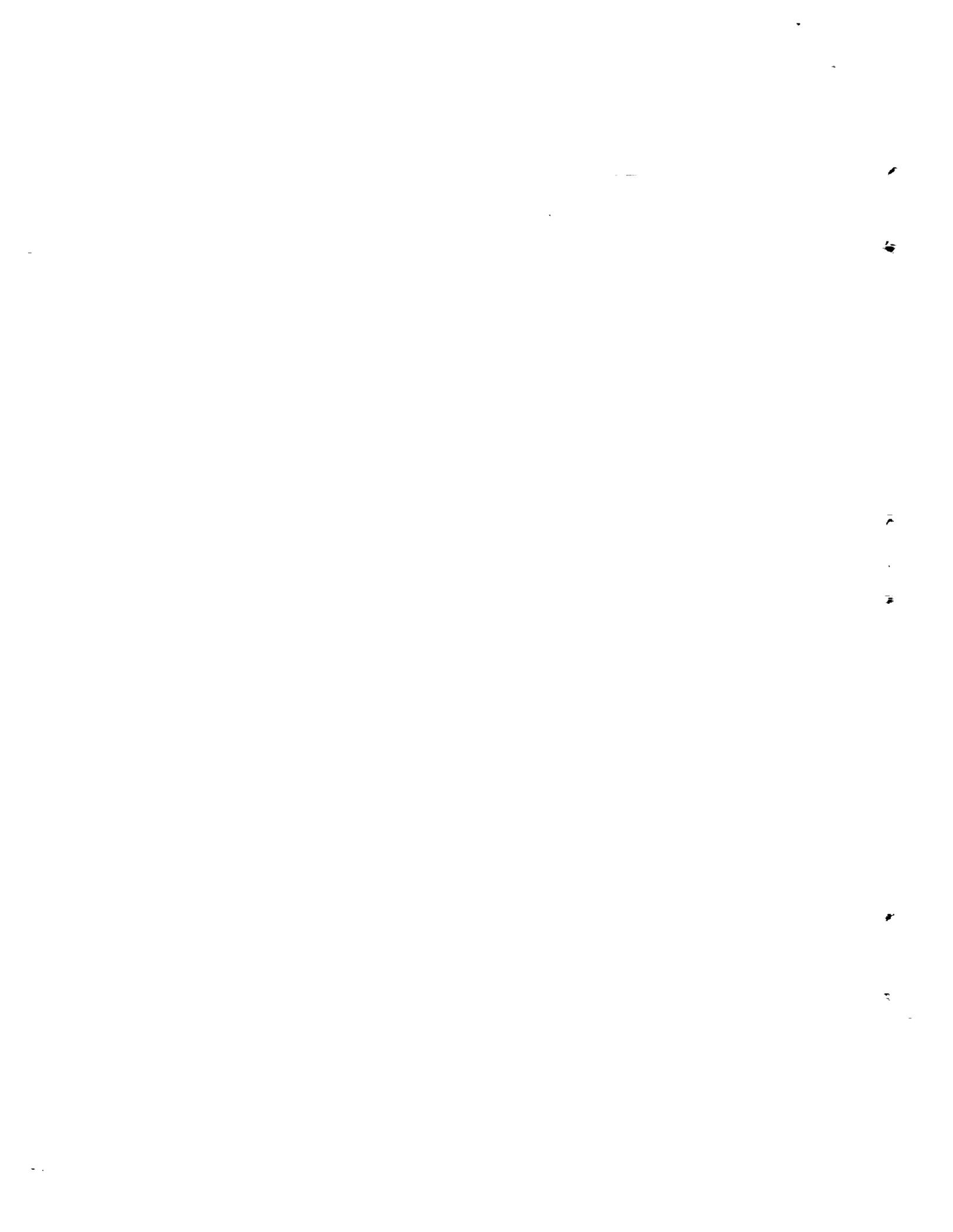
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